With the exception of a few doubtful ones, a total of 133 species, 3 subspecies, and 17 varieties is recognized in this study. This is more than five times the number of species known to Hackel in 1890 (24), and more than twice the number reported by Schumann and Lauterbach in 1901–1905 (69, 70). Hitchcock (33) and Chase (17, 18) together enumerated 96 species and 7 varieties in 1935–1943, but their reports were based entirely upon the collections of the three Archbold Expeditions. These expeditions were sponsored by Mr. Richard Archbold, his Archbold Expeditions being affiliated with the American Museum of Natural History. The first expedition was based on Port Moresby and explorations extended inward to the summit of the Owen Stanley Range, the second was an extended trip up the Fly River, and the third explored the Mount Wilhelmina region of central Netherlands New Guinea. The excellent botanical collections were made by Mr. L. J. Brass, who was assisted, when in Netherlands New Guinea, by Mr. C. Versteegh and Dr. E. Meyer-Drees. The botanical collections assembled on these three extensive expeditions were turned over to Dr. E. D. Merrill for study and for distribution of the duplicate sets. In as far as grasses are concerned, these collections are the most extensive which have thus far come out of New Guinea. They have served as a basis for the present study, but in addition there have been available numerous collections made by Mrs. M. S. Clemens in Northeast New Guinea, by Mr. C. E. Carr in British New Guinea, and small collections made by the writer and other servicemen stationed in the region during the recent war. Shortly before the war, the Arnold Arboretum was fortunate in receiving practically a complete set of duplicates of the collections made in Netherlands New Guinea in 1940 by R. Kanehira and S. Hatusima. The grasses from this collection proved invaluable in interpreting the new species described by J. Ohwi (56). Much of this large island is still unknown botanically, and it is to be expected that future explorations will yield new records, as well as a considerable number of novelties.

In the present work the systematic order of the genera under the tribes follows, in the main, that of Pilger (59). In characterizing the accepted genera, the original descriptions and later ones by other authors have been consulted, and these descriptions have been studied in association with extensive collections of both Old and New World material. Within recent years there has been a tendency among some agrostologists to subdivide large genera into smaller groups. Where these small genera seem to be reasonably well defined, they have been recognized in this work; when, on the other hand, there seems to be a large amount of intergradation between them and the genera from which they have been segregated, they have been rejected. In general I have taken a rather conservative attitude somewhere, perhaps, midway between that of Hitchcock (34) and Stapf (71), but probably closer to the concept of the former author. These conclusions were, in large part, based upon the study of Malaysian material and hence must be regarded as somewhat tentative. The descrip-

tions of the species herein presented are based on the original diagnoses, supplementary data provided by later authors, and an actual examination of all available specimens. Whenever type material was available, it was consulted and the New Guinea specimens were critically compared with it.

During the course of this study it was found desirable to describe a certain number of new species and varieties and to make some new combinations; at the same time certain species have been reduced to synonymy. In one case a new name had to be given to an old species, since the original specific epithet had an earlier homonym in the proper genus. A list of the new names is given below:

Panicum creperum nom. nov.
Panicum mindanaense Merr. var. *pilosum* var. nov.
Brachiaria fusiformis sp. nov.
Brachiaria subquadripara (Trin.) Hitchc. var. *piligera* (F. Muell. ex Benth.) comb. nov.
Cyrtococcum patens (L.) A. Camus var. *Warburgii* (Mez) comb. nov.
Digitaria abortiva sp. nov.
Setaria montana sp. nov.
Isachne obtecta sp. nov.
Isachne villosa (Hitchc.) comb. nov.
Dimeria monostachya sp. nov.
Dimeria dipteros sp. nov.
Dimeria ciliata Merr. var. *heteromorpha* var. nov.
Eulalia irritans (R. Br.) Kuntze var. *egregia* var. nov.
Microstegium ciliatum (Trin.) A. Camus var. *laxum* (Nees ex Steud.) comb. nov.
Ischaemum littorale sp. nov.
Hemarthria subulata sp. nov.
Eremochloa ciliaris (L.) Merr. var. *elata* var. nov.
Rottboellia rottboellioides (R. Br.) comb. nov.
Chrysopogon filipes (Benth.) comb. nov.
Chrysopogon filipes (Benth.) Reeder var. *arundinaceus* var. nov.
Andropogon micranthus Kunth var. *multicispiculus* (Ohwi) comb. nov.
Andropogon brevifolius Swartz var. *cryptopodus* (Ohwi) comb. nov.
Andropogon spicigerus (S. T. Blake) comb. nov.
Themeda gigantea (Cav.) Hack. var. *novoguineensis* var. nov.

The place of deposit of the type specimens of the new species and varieties is given with the citation of specimens. Since the most representative specimen was always selected as the type, they are of necessity not all in the same herbarium.

The dates of collection of the specimens cited are omitted except in the case of types. The island of New Guinea is divided into two parts by a line running north and south essentially through its center. To the west of this line is Netherlands New Guinea, administered by the Netherlands government; the eastern part is divided into two subdivisions, Northeast New Guinea (Kaiser Wilhelmsland of the Germans) to the north and British New Guinea (Papua) to the south. British and Northeast New Guinea are further subdivided into divisions and districts. In citing the specimens the order is as follows: British New Guinea, Northeast New Guinea, Netherlands New Guinea, New Britain (or other islands of the Bismarck Archipelago), and Solomon Islands. A more exact location is

given whenever possible by using the division or district name. Precise localities are given according to what data are available on the labels. In addition notes concerning habitat are also cited whenever these are available on the labels. This latter practice seemed desirable since the collections from New Guinea are not extensive enough to permit of making a general statement as to the habitat.

Abbreviations used in designating the herbaria in which cited specimens are deposited are as follows:

A — Arnold Arboretum of Harvard University
GH — Gray Herbarium of Harvard University
NY — Britton Herbarium, New York Botanical Garden
US — United States National Herbarium.

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GRAMINEAE

Subfamily PANICOIDEAE

Spikelets typically 2-flowered, the rachilla not prolonged beyond the upper floret; perfect spikelets with the terminal perfect or pistillate floret

and a staminate or neuter floret below, often reduced to the lemma (in *Isachne* sometimes both florets fertile); one glume (or rarely both glumes) wanting; articulation below the spikelets either in the pedicel, the rachis or at the base of a cluster of spikelets, the spikelets falling entire, either singly, in groups, or together with joints of the rachis; spikelets, or at least the fertile florets, often more or less dorsally compressed.

KEY TO THE TRIBES

1. Spikelets perfect or with staminate or neuter and perfect or pistillate spikelets mixed in the same inflorescence and so arranged that a staminate or neuter spikelet is near a perfect or pistillate spikelet (*Spinifex* dioecious).
   2. Spikelets solitary or paired, more or less similar; glumes usually membranous, the first often smaller or sometimes obsolete or wanting; lower lemma mostly like the second glume in texture; upper (fertile) lemma more or less indurated, firmer than the glumes, usually awnless ..... I. *Paniceae*.
   2. Spikelets usually paired, one sessile, the other pediceled, similar or more or less unlike, the sessile then usually perfect or pistillate and the pediceled staminate or neuter; lemmas hyaline or membranous, thinner than the glumes, usually awned ..... II. *Andropogoneae*.
1. Spikelets unisexual, the staminate and pistillate in different inflorescences or in different parts of the same inflorescence, the pistillate below; lemmas hyaline or membranous, thinner than the glumes ..... III. *Maydeae*.

Tribe I. PANICEAE

Spikelets 2-flowered, the lower floret often reduced, solitary or in pairs, similar, perfect (rarely unisexual), usually falling entire at maturity; glumes usually membranous, the first commonly smaller, sometimes obsolete or wanting (very rarely the second also wanting); lower lemma similar to the second glume, at least in texture, rarely more or less indurated, empty or enclosing a staminate flower, the palea present or wanting (bearing a perfect flower in some species of *Isachne*); upper lemma and palea similar in texture, usually indurated, or at least firmer than the glumes, awnless or rarely with a short straight awn from the tip; stigmas 2, stamens usually 3. Annuals or perennials with herbaceous (rarely woody) culms and spikelets borne on a usually continuous rachis of solitary, digitate or scattered spikes or racemes or in open or contracted, sometimes spikelike panicles.

KEY TO THE GENERA

1. Spikelets subtended or surrounded by 1 to many bristles, or the rachis produced beyond the spikelets.
   2. Spikelets perfect.
      3. Bristle single, produced beyond the terminal spikelet of the branch, the branches deciduous, falling with the 1 to several spikelets ..... 16. *Pseudoraphis*.
      3. Bristles several below each spikelet, or if only one, then the spikelets falling free from the branch.
         4. Bristles united at base into a bur-like involucre permanently enclosing the 2 to several spikelets ..... 18. *Cenchrus*.
         4. Bristles slender, not united at base.
            5. Spikelets falling free from the bristles; fertile lemma more or less transversely rugose ..... 15. *Setaria*.
            5. Spikelets falling with the subtending bristles; fertile lemma smooth ..... 17. *Pennisetum*.
   2. Spikelets unisexual, the staminate and pistillate in spatheate inflorescences on different plants ..... 20. *Spinifex*.

1. Spikelets neither surrounded by bristles nor the rachis produced beyond the spikelet.
   6. Spikelets more or less laterally compressed or oblique.
      7. Fertile lemma strongly dorsally compressed (see also *Oplismenus*).
         8. Second glume inflated-saccate; fertile lemma stipitate.....6. *Sacciolepis.*
         8. Second glume not inflated-saccate; fertile lemma with lateral appendages or excavations at base, not stipitate.....3. *Ichnanthus.*
      7. Fertile lemma more or less laterally compressed.
         9. First glume about half as long as the spikelet; fertile lemma strongly laterally compressed and gibbous on the back.....8. *Cyrtococcum.*
         9. First glume about as long as the spikelet; fertile lemma not strongly gibbous; second glume uncinate-spiny at maturity.....7. *Pseudechinolaena.*
   6. Spikelets terete or distinctly dorsally compressed (see also *Sacciolepis myosuroides*).
      10. Spikelets dimorphic.
         11. Chasmogamous spikelets borne in small terminal panicles; cleistogamous spikelets borne singly in the axils of the vegetative branches; culms hard and wiry.....9. *Cleistochloa.*
         11. Spikelets of two kinds in the same inflorescence, the upper 4–6 staminate, the lower one or two pistillate or perfect; low strand plants..21. *Thuarea.*
      10. Spikelets alike, all perfect.
         12. Glumes equal or nearly so, often falling free from the rest of the spikelet; florets both alike or the lower somewhat larger.....19. *Isachne.*
         12. Glumes usually unequal, the spikelets falling entire; terminal floret perfect, the lower rudimentary or staminate only and with a lemma of the same texture as the glumes.
            13. Glumes or lemmas or both awned, or if short pointed only, the summit of the fertile palea not enclosed (see also *Panicum ambiguum*).
               14. Racemes digitate or approximate; second glume densely ciliate-winged at maturity; fertile lemma awned.....10. *Alloteropsis.*
               14. Racemes simple or compound, not digitate; second glume not ciliate-winged; fertile lemma awnless or with an awn 0.5 mm. long or less.
                  15. Glumes awned, awn of the first glume the longer....5. *Oplismenus.*
                  15. Glumes awnless or nearly so; sterile lemma awned or awn-tipped.
                     16. Sterile lemma 2-lobed, the delicate awn arising from between the lobes; fertile lemma weakly indurated.....22. *Melinis.*
                     16. Sterile lemma entire; fertile lemma strongly indurated.....4. *Echinochloa.*
            13. Glumes and lemmas awnless (see also *Echinochloa colonum*).
               17. First glume wanting or much reduced.
                  18. Rachilla thickened below the second glume into a ring-like or bead-like callus.....13. *Eriochloa.*
                  18. Rachilla not thickened as above.
                     19. Fertile lemma strongly indurate, the margins inrolled.....14. *Paspalum.*
                     19. Fertile lemma cartilaginous, the margins hyaline, not inrolled.....12. *Digitaria.*
               17. First glume prominent.
                  20. Fertile lemma thin or membranous, the palea not enclosed at summit; panicle spikelike.....11. *Hymenachne.*
                  20. Fertile lemma chartaceous-indurate, clasping the palea to its summit.
                     21. Spikelets in few to many spikelike racemes; first glume turned toward the rachis.....2. *Brachiaria.*
                     21. Spikelets in open or contracted panicles, or if in racemes the first glume turned away from the rachis.....1. *Panicum.*

1. Panicum L.

Panicum L., Sp. Pl. 55. 1753.

Spikelets more or less dorsally compressed, in open or compact panicles, rarely in racemes, the back of the fertile lemma turned toward the rachis; glumes 2, membranous, usually unequal, the first often minute, the second usually as long as the spikelet (rarely the first glume as long as the spikelet or the second somewhat shorter); sterile lemma membranous or rarely slightly indurate, usually enclosing a membranous or hyaline palea and sometimes a staminate flower; fertile lemma chartaceous to strongly indurate, the margins inrolled over a palea of the same texture (rarely the margins merely clasping the palea and not strongly inrolled). Annuals or perennials of various habit.

TYPE SPECIES: *Panicum miliaceum* L.

KEY TO THE SPECIES

1. Inflorescence of few to many spikelike racemes rather distant on the axis.
   2. Fertile lemma glabrous, often rugose.
      3. Second glume half to two-thirds as long as the spikelet; fertile lemma acute, minutely beaked ..... 1. *P. distans.*
      3. Second glume as long as the spikelet.
         4. Spikelets 2–4 mm. long; fertile lemma obtuse, mucronate or awned.
            5. Spikelets 3–4 mm. long; first glume acute, nearly as long as the spikelet ..... 2. *P. ambiguum.*
            5. Spikelets 2 mm. long; first glume truncate or mucronate, less than half as long as the spikelet ..... 3. *P. reptans.*
         4. Spikelets 5–7 mm. long; fertile lemma with a short, erose, laterally compressed crest at the apex ..... 6. *P. zizanioides.*
   2. Fertile lemma pubescent ..... 15. *P. marginatum.*
1. Inflorescence not as above, usually a diffuse panicle.
   6. Second glume shorter than the spikelet; fertile lemma weakly indurate.
      7. Glumes unequal, the second half to three-fourths as long as the spikelet ..... 4. *P. nodosum.*
      7. Glumes about equal, about one-third as long as the spikelet .. 5. *P. creperum.*
   6. Second glume as long as the spikelet.
      8. First glume as long as the spikelet or nearly so.
         9. Spikelets 2–2.8 mm. long; sheath surface glabrous (pilose in var. *pilosa*) ..... 11. *P. mindanaense.*
         9. Spikelets 3.2–3.5 mm. long; sheaths papillose-hirsute .... 12. *P. macrocladum.*
      8. First glume half as long as the spikelet or shorter.
         10. Sheaths tuberculate-hispid.
            11. First glume one-third as long as the spikelet, obtuse; blades 8–15 mm. wide ..... 9. *P. cambogiense.*
            11. First glume half as long as the spikelet, acute; blades 2–4 mm. wide .... 10. *P. viale.*
         10. Sheaths not tuberculate-hispid.
            12. Blades 8–25 mm. wide; culms stout, often somewhat woody.
               13. Spikelets 3–4 mm. long; first glume hyaline ..... 8. *P. paludosum.*
               13. Spikelets 2–2.5 mm. long; first glume membranous.
                  14. Ligule membranous; fertile lemma weakly indurated, pale at maturity ..... 7. *P. auritum.*
                  14. Ligule a ring of hairs; fertile lemma strongly indurated, brown at maturity ..... 13. *P. sarmentosum.*
            12. Blades 3–6 mm. wide; culms slender.
               15. Fertile lemma glabrous; ligule membranous ..... 14. *P. Archboldii.*
               15. Fertile lemma pubescent; ligule a ring of hairs ..... 15. *P. marginatum.*

1. **Panicum distans** Trin., Sp. Gram. Ic. 2: *pl. 172.* 1829; Hitchc., Brittonia 2: 121. 1936. Type from Australia.
Paspalidium distans (Trin.) Hughes, Kew Bull. 1923: 318. 1923.

Perennial; culms glabrous, ascending or spreading, 20–70 cm. tall; sheaths shorter than the internodes, ciliate on the overlapping margins; ligule membranous, ciliate, about 0.5 mm. long; blades linear, flat, as much as 15 cm. long, 2–5 mm. wide, sharply narrowed to a very short petiole-like base, more or less scabrous, especially on the margins; inflorescence as much as 20 cm. long, consisting of several to many short racemes 1–4 cm. distant on the slender scabrous axis; basal racemes as much as 3 cm. long, sometimes with a few short branches, the apical racemes reduced to a few spikelets; spikelets crowded, glabrous, very turgid, about 2 mm. long, the pedicels discoid-tipped; first glume about one-third the length of the spikelet with 3 strong nerves (sometimes with 1 or 2 additional pairs of faint nerves); second glume about two-thirds the length of the spikelet, 7-nerved; sterile lemma as long as the spikelet, 5-nerved, the palea poorly developed; fertile lemma minutely beaked, transversely rugose on the lower half, granular-roughened above, the margins strongly inrolled.

British New Guinea: Western Division: Wuroi, Oriomo River, alt. 10–30 m., *Brass 5828* (GH, US) (damp situations on savannah); Daru Island, *Brass 6387* (A, US) (occasional on wet soils in savannah forests); Gaima, Lower Fly River, *Brass 8343* (A, US) (damper parts of savannah forest); Tarara, Wassi Kussa River, *Brass 8696* (A, US) (weed in villages).

Australia and New Guinea.

2. **Panicum ambiguum** Trin., Mém. Acad. St. Petersb. VI. Sci. Nat. 1: 245. 1834; Hack., Bot. Jahrb. 6: 234. 1855. Based on *Urochloa paspaloides* Presl.
Urochloa paspaloides Presl, Rel. Haenk. 1: 318. 1830 (non *Panicum paspaloides* Pers. 1805, nec Hayata 1911); Scribn., Missouri Bot. Gard. Rep. 10: 54. *pl. 14.* 1899. Type from the Philippines.
Brachiaria ambigua (Trin.) A. Camus in Lecomte, Fl. Gén. Indo-Chine 7: 433. 1922.
Brachiaria paspaloides (Presl) C. E. Hubb., Hook. Ic. 34: sub *pl. 3363.* 1938.
Urochloa ambigua (Trin.) Pilger, Nat. Pflanzenfam. ed. 2. 14e: 35. 1940.

Culms ascending to decumbent and creeping, branching, up to 1 meter or more long, glabrous except for the more or less pubescent nodes; sheaths slightly shorter than the internodes, glabrous to more or less pubescent, the margins often ciliate, especially toward the ligule; ligule about 1 mm. long, consisting of a row of whitish hairs or the lower part somewhat membranous; blades flat, 8–15 cm. long, 5–8 mm. wide, glabrous to more or less pubescent, often papillose-hispid along the nerves; inflorescence of 3–7 racemes (rarely only 2), 2–4 cm. long, alternate and 1–2 cm. distant along the slender flattened axis, this more or less pubescent and scabrous along the margins; rachis about 0.75 mm. wide, pubescent to nearly glabrous. the margins scabrous; spikelets paired, glabrous, short-pedicellate, 3–4 mm. long; glumes 5-nerved, the first about four-fifths as long as the second, this equaling the spikelet; sterile lemma 5-nerved, slightly indurate and faintly transversely-rugose on the back, enclosing a minute palea; fertile lemma stramineous, indurate, transversely-rugose and with a terminal awn about 0.5 mm. long, this enclosed within the tip of the sterile lemma.

Northeast New Guinea: Morobe District: Finschhafen, *Clemens 4280* (A, US). Netherlands New Guinea: Triton Bay, *Hombron 1841* (US).

3. **Panicum reptans** L., Syst. Nat. ed. 10. 2: 870. 1759; Hitchc. and Chase, Contr. U. S. Nat. Herb. 15: 36. *fig. 17.* 1910; Chase, Jour. Arnold Arb. 20: 308. 1939. Type from Jamaica.

Panicum prostratum Lam., Tabl. Encycl. 1: 171. 1791; K. Schum. and Lauterb., Nächtr. Fl. Deutsch. Schutzgeb. Südsee 56. 1905. Type from Santo Domingo.
Brachiaria prostrata (Lam.) Griseb., Abh. Boehm. Ges. Wiss. 7: 263. 1857.
Urochloa reptans (L.) Stapf in Prain, Fl. Trop. Afr. 9: 601. 1920.
Brachiaria reptans (L.) C. A. Gard. and C. E. Hubb., Hook. Ic. 34: sub *pl. 3363.* 1938.

Culms slender, decumbent or prostrate, the upright flowering branches 10–40 cm. tall, glabrous except for the more or less pubescent nodes; sheaths shorter than the internodes, glabrous to somewhat papillose-pilose, the margins ciliate; ligule a row of white hairs about 1 mm. long; blades lanceolate, cordate at base, 1–6 cm. long, 4–10 mm. wide, glabrous to sparsely hispid, the margins scabrous; racemes 3–10, 1–3 cm. long, erect or spreading, somewhat distant on the scabrous, angled axis; spikelets crowded, about 2 mm. long, ovate, acute, the pedicels discoid-tipped and often with long stiff hairs as long as the spikelets; first glume about 0.5 mm. long, hyaline, nerveless, truncate or apiculate; second glume as long as the spikelet, 7–9-nerved; sterile lemma 5-nerved and with a well-developed palea; fertile lemma transversely rugose, obtuse and mucronate, the mucro slender.

BRITISH NEW GUINEA: Central Division: Kanosia, *Carr 11091* (NY) (open clearings in forest); Western Division: Daru Island, *Brass 6303* (A, US) (matted on damp soil in native garden clearings). NORTHEAST NEW GUINEA: *Weinland* in 1889–91 (US); Morobe District: Four miles south of Langemak Bay, near Finschhafen, *Sawyer 91* (A); Kajabit, *Clemens 10475* (US).

Widely distributed in the tropics and subtropics.

4. **Panicum nodosum** Kunth,[4] Rev. Gram. 1: Suppl. 9. 1830; K. Schum. and Lauterb., Nächtr. Fl. Deutsch. Schutzgeb. Südsee 56. 1905. Based on *P. multinode* Presl.
Panicum multinode Presl, Rel. Haenk. 1: 303. 1830 (non Lam. 1797). Type from the Philippines.
Panicum Arnottianum Nees in Steud., Syn. Pl. Glum. 1: 59. 1854. Habitat in India and Java.
Hemigymnia multinodis (Presl) Stapf in Prain, Fl. Trop. Afr. 9: 742. 1920.
Hemigymnia Arnottiana (Nees) Stapf in Prain, Fl. Trop. Afr. 9: 742. 1920.
Ottochloa nodosa (Kunth) Dandy, Jour. Bot. 69: 55. 1931.
Ottochloa Arnottiana (Nees) Dandy, Jour. Bot. 69: 55. 1931; Henr., Blumea 4: 531. 1941.

Culms creeping, slender, sparingly branching from the lower nodes, glabrous; sheaths more or less papillose-pilose, ciliate on the margins; ligule membranous, about 0.3 mm. long; blades thin, lanceolate, rounded to subcordate at base, 4–12 cm. long, 5–12 mm. wide, glabrous to more or less papillose-pilose; panicle contracted to more or less open, the slender branches angled, scabrous on the angles; spikelets lanceolate, glabrous to more or less pubescent, 2.8–3.2 mm. long; first glume 1–1.5 mm. long, acute, 3–5-nerved; second glume half to three-fourths as long as the spikelet, 5–7-nerved; sterile lemma equaling the spikelet, 7-nerved; fertile lemma pale, chartaceous-indurate, the tip laterally compressed into a tiny crest.

BRITISH NEW GUINEA: Central Division: Kanosia, *Carr 11032* (NY); Western Division: Daru Island, *Brass 6260* (A, US) (abundant and covering ground under shade of rain-forest margins); Goodenough Island: Ma-

[4] For a discussion of this binomial and more complete synonymy, see Merrill, Bull. Torr. Bot. Club 60: 637. 1933.

launa Creek, *Burcham 128* (US) (scanty moist soil along creek bed and banks).
Africa, Indo-Malayan region to Australia and New Guinea.

5. **Panicum creperum** nom. nov.
Hemigymnia fusca Ridley, Fl. Malay Pen. 5: 228. 1928. Type from Malaya.
Ottochloa fusca (Ridley) Dandy, Jour. Bot. 69: 55. 1931; Henr., Blumea 4: 531. 1941.

Perennial; culms creeping, somewhat woody below, the ascending branches 30–120 cm. tall; sheaths shorter than the internodes, glabrous, often ciliate on the margins; ligule membranous, about 0.3 mm. long; blades glabrous, lanceolate, 10–20 cm. long, 7–15 mm. wide; panicle nodding, 15–25 cm. long, the slender, angled, scabrous branches ascending, as much as 14 cm. long; spikelets glabrous, 2.5–3 mm. long, brown, crowded in short racemes on the panicle branches; glumes about equal or the second slightly longer, about one-third as long as the spikelet, acute or obtuse; sterile lemma equaling the spikelet or slightly shorter; fertile lemma chartaceous-indurate, the tip laterally compressed into a tiny crest.

British New Guinea: Central Division: Veiya, *Carr 11622* (US, NY) (river bank).
Indo-China, Malaya, Sumatra to New Guinea.

Closely related to *Panicum nodosum* Kunth, but differing in the somewhat woody culms, larger blades, and the shorter nearly equal glumes.

Since the specific epithet "*fuscum*" is preoccupied in *Panicum*, a new name is proposed.

6. **Panicum zizanioides** H.B.K., Nov. Gen. et Sp. 1: 100. 1815; Hitchc. & Chase, Contr. U. S. Nat. Herb. 15: 325. *fig. 367*. 1910; Chase, Jour. Arnold Arb. 24: 66. 1943. Type from Colombia.
Panicum oryzoides Swartz, Prodr. Veg. Ind. Occ. 23. 1788 (non Ard. 1764). Type from Jamaica.
Acroceras oryzoides (Swartz) Stapf in Prain, Fl. Trop. Afr. 9: 622. 1920.
Acroceras zizanioides (H.B.K.) Dandy, Jour. Bot. 69: 54. 1931.

Perennial; culms decumbent at base, rooting and rather sparsely branching from the lower nodes, rather robust, the flowering portion ascending or spreading, as much as 1 meter long, glabrous or with a few appressed hairs below the nodes; sheaths ciliate on the margin, sometimes papillose-hirsute toward the summit, otherwise glabrous; ligule membranous, about 0.5 mm. long; blades ovate-lanceolate, 4–15 cm. long, 10–30 mm. wide, subcordate at base, glabrous or rarely with a few appressed hairs; panicle 10–25 cm. long, composed of a few ascending or appressed, stiff, slender, angled, scabrous branches, with short-pediceled more or less secund spikelets; spikelets 5.5–7 mm. long, rather turgid; first glume about two-thirds as long as the spikelet, acute, 3–5-nerved; second glume and sterile lemma equal, abruptly contracted into a short keeled tip, 5-nerved, the lateral nerves of the lemma more or less obscure below the tip; sterile palea about two-thirds as long as the lemma; fertile lemma smooth and shining and with a short, erose, laterally compressed crest at the apex, the tip of the palea similarly compressed and bent outward.

Netherlands New Guinea: Bernhard Camp, Idenburg River, alt. 50 m., *Brass 13946* (A, US) (abundant in semi-open swampy forest of river flood plain).
Tropical America, Africa, India, and New Guinea.

7. **Panicum auritum** Presl ex Nees, Agros. Bras. 176. 1829; Presl, Rel. Haenk. 1: 305.

1830; Scribn., Missouri Bot. Gard. Rep. 10: 46. *pl. 15.* 1899; Chase, Jour. Arnold Arb. 24: 86. 1943. Type from Luzon, Philippines.

Hymenachne aurita (Presl ex Nees) Balansa, Jour. de Bot. 4: 144. 1890;[5] Backer in Heyne, Nutt. Pl. Ned.-Ind. ed. 2. 1: 238. 1927.

Culms glabrous, ascending or spreading, often rather stout, as much as 2 meters tall; sheaths distinctly shorter than the internodes, glabrous or sometimes ciliate on the margins; ligule membranous, about 0.5 mm. long or less; blades lanceolate, acuminate, 10–20 cm. long, 8–25 mm. wide, glabrous, rather firm, subcordate at base, the margins scabrous; panicle 20–40 cm. long, contracted or the branches stiffly spreading, these and the pedicels scabrous; spikelets glabrous, about 2.5 mm. long, broadly lanceolate, acuminate; first glume 3-nerved, about one-third as long as the spikelet, acute or sometimes minutely apiculate; second glume and sterile lemma subequal, 5-nerved, the lemma usually a little shorter, epaleate or with a much reduced palea; fertile lemma chartaceous, thin, stramineous, the margins clasping the palea but not inrolled or only weakly so, the tip of the palea sometimes free.

NETHERLANDS NEW GUINEA: Bernhard Camp, Idenburg River, alt. 50 m., *Brass 13942* (A, US) (common in swamp forests of river silt plains).

Indo-Malayan region to New Guinea.

8. **Panicum paludosum** Roxb., Hort. Beng. 8. 1814. nomen, Fl. Ind. 1: 310. 1820. descr.; K. Schum., Notizbl. Bot. Gart. Berlin 1: 208. 1896. Type from India.

Aquatic perennial; culms decumbent, floating or rooting in the mud, soft, often 1 cm. in diameter, the flowering portion erect or ascending, as much as 1 meter tall; sheaths glabrous, longer than the internodes; ligule a ring of hairs about 2 mm. long; blades thin, 10–30 cm. long, 8–16 mm. wide, scabrous on the margins, scaberulous on the upper surface, nearly smooth below; panicle partly included in the uppermost sheath, at first contracted, finally very diffuse, 15–30 cm. long, the branches angled and scabrous; spikelets very numerous, glabrous, lanceolate, acuminate, 3–4 mm. long; first glume hyaline, acute, about 1 mm. long, with a faint midnerve and sometimes a pair of obscure lateral nerves; second glume and sterile lemma equal or subequal, 7–9-nerved, the lemma enclosing a hyaline palea about two-thirds its length; fertile lemma about 2.5 mm. long, smooth and shining, pale at maturity.

BRITISH NEW GUINEA: Western Division: Middle Fly River, Lake Daviumbu, *Brass 7647* (A) (swampy lakeshore, uncommon). NORTHEAST NEW GUINEA: Morobe District: Near Kajabit Mission, *Clemens 10696* (US).

India to Southern China, Malaya, Philippines, Australia and New Guinea.

9. **Panicum cambogiense** Balansa,[6] Jour. de Bot. 4: 142. 1890. Type from Indo-China.

Panicum caesium Nees, Jour. Bot. Kew Misc. 2: 97. 1850 (non Nees 1836); K. Schum. and Lauterb., Fl. Deutsch. Schutzgeb. Südsee 179. 1901. Type from the Philippines.

Panicum reticulatum Thwaites in Trimen, Jour. Bot. 23: 271. 1885 (non Torr. 1852, nec Griseb. 1857). Type from Ceylon.

Panicum cruciabile Chase, Jour. Arnold Arb. 20: 309. 1939. Based on *P. reticulatum* Thwaites.

[5] Given as "H[ymenachne] aurita Presl," but presumably based on *Panicum auritum* Presl ex Nees.

[6] For a further discussion of the accepted binomial, see Henrard, Blumea 3: 444. 1940.

Robust annual; culms 80–100 cm. tall, rather stout, more or less tuberculate-hispid, especially on the portion not covered by the sheaths, the nodes bearded; sheaths somewhat keeled, especially toward the summit, densely tuberculate-hispid, the hairs stiff and breaking off readily; ligule a row of tawny hairs about 1 mm. long; blades glabrous, as much as 25 cm. long, 8–15 mm. wide; panicle open, 25-40 cm. long, the branches flexuous; spikelets glabrous, about 2 mm. long; first glume about one-third as long as the spikelet, clasping, obtuse, 7-nerved; second glume and sterile lemma equal, 9–11-nerved, the nerves connected here and there by faint cross-nerves giving a reticulate appearance; sterile palea as long as the lemma, hyaline except for the two marginal nerves; fertile lemma smooth and shining, olive-brown at maturity.

BRITISH NEW GUINEA: Northern Division: Ambasi, *Copeland King* in 1912 (US); Western Division: Strickland River, *W. Bauerlen 61* (US). NORTHEAST NEW GUINEA: Dreger Harbor (Finschhafen area), *Reeder 904* (A, US) (low wet ground). SOLOMON ISLANDS: Bougainville: *Kajewski 1897* (GH, US).

Ceylon, Burma, the Philippines, New Guinea, and the Solomon Islands.

10. **Panicum viale** Chase, Jour. Arnold Arb. 20: 310. 1939. Type from New Guinea.

Perennial; culms tufted, erect or ascending, 50–100 cm. tall, sparingly branching, tuberculate-hispid on the portions not covered by the sheaths; sheaths much shorter than the internodes, tuberculate-hispid like the nodes and the exposed parts of the culm; ligule a row of stiff hairs about 1 mm. long; blades flat to subinvolute, rather stiff, 10–20 cm. long, 2–4 mm. wide (blades on the basal sheaths shorter and narrower), papillose-pilose to tuberculate-hispid; panicle open, 20–30 cm. long, the branches flexuous but rather stiff, angled, scabrous, spikelet-bearing toward the ends; spikelets glabrous, 2 mm. long, slightly less than 1 mm. wide, plump, abruptly short-pointed; first glume half as long as the spikelet, clasping, acuminate, with a strong midnerve and 1 or 2 additional pairs of obscure lateral nerves; second glume and sterile lemma equal, 7-nerved; sterile palea hyaline, about three-fourths as long as the lemma; fertile lemma smooth and shining, olive-brown at maturity, the 5 nerves showing as pale stripes.

BRITISH NEW GUINEA: Central Division: Rona, Laloki River, alt. 450 m., *Brass 3631* (A, TYPE, US) (fairly common on roadsides); Kanosia, *Carr 11048, 11104* (US, NY) (open savannah lands); ? Division: Barawara, *MacGregor 21* (US).

Endemic.

Related to *Panicum cambogiense,* but that species is a robust annual with much broader, glabrous leaves and more turgid spikelets in which the first glume is only about one-third as long as the spikelet and is obtuse rather than acuminate. Both species have tuberculate-hispid sheaths. The type specimen (*Brass 3631*) was cited as *Panicum tuberculatum* Presl by Hitchcock (Brittonia 2: 122. 1936).

11. **Panicum mindanaense** Merrill, Philip. Jour. Sci. Bot. 1: Suppl. 360. 1906; Hitchc., Brittonia 2: 121. 1936. Type from Mindanao, Philippines.

Culms caespitose, glabrous, erect or ascending, 20–80 cm. tall; sheaths shorter than the internodes, often somewhat papillose, especially toward the summit, glabrous or with ciliate margins; ligule a ring of stiff hairs 0.5–1 mm. long; blades flat, ascending, mostly 5–15 cm. long, 2–4 mm. wide, glabrous or essentially so; panicle diffuse, 10–15 cm. long, the

slender scabrous branches rather distant, spikelet-bearing toward the ends; spikelets often purplish, 2–2.8 mm. long, glabrous or the midnerve of the glumes scabrous; first glume as long as the spikelet or nearly so, clasping, acuminate, 5–7-nerved, separated from the second glume by a distinct internode; second glume and sterile lemma equal, acuminate, 5–7-nerved, the lemma with a hyaline palea about half its length; fertile lemma elliptic, smooth and shining.

BRITISH NEW GUINEA: Western Division: Dagwa, Oriomo River, alt. 40 m., *Brass 5960* (GH, US) (damp situations on creek flats); Mabaduan, *Brass 6485* (A, US) (common on old grass-grown garden lands, especially on wet soils); Lake Daviumbu, Middle Fly River, *Brass 7522, 7851, 7852* (A, US) (savannahs; tufted on patches of hard ground). NORTHEAST NEW GUINEA: Morobe District: Dreger Harbor, near Finschhafen, *Reeder 905* (A, US) (low, wet ground in the open).

Philippines and New Guinea.

Brass 6485, cited as "? *Panicum papuanum* Mez" by Chase (17, p. 309), is a slightly more robust plant than the others and has blades as much as 20 cm. long. The original description of *P. papuanum* states that the glumes are 7-nerved and that the sterile lemma (glume III) is 9-nerved. *Brass 6486* has both glumes and sterile lemma 5-nerved. The spikelets are identical with those of a type duplicate of *P. mindanaense*.

11a. **Panicum mindanaense** Merr. var. **pilosum** var. nov.

A typo vaginis laminisque dense pilosis differt.

NETHERLANDS NEW GUINEA: Waren, *Kanehira & Hatusima 13093* (A, TYPE) March 26, 1940 (in open dry rocky grass field).

Differs from the species in having the sheaths and blades densely pilose.

12. **Panicum macrocladum** Chase, Jour. Arnold Arb. **20**: 308. 1939. Type from New Guinea.

Panicum Braunii Mez, Bot. Jahrb. 56: Beibl. 125: 5. 1921 (non Steud. 1854). Type from the Bismarck Archipelago.

Culms glabrous, erect or ascending, about 1 meter tall, the nodes often black; sheaths much shorter than the internodes, papillose-hirsute, the upper sometimes nearly glabrous, at least on the lower half; ligule a dense row of hairs about 2 mm. long; blades flat, 18–30 cm. long, 4–7 mm. wide, loosely hirsute on both surfaces or scabrous only toward the attenuate apex, the margins scabrous; panicle partly included in the upper sheath, 40–50 cm. long, nodding, with numerous subcapillary compound branches as much as 25 cm. long, the slender angled axis and branches scabrous, the spikelets mostly aggregated toward the ends of the branchlets; spikelets ovate-lanceolate, acuminate, glabrous, 3.2–3.5 mm. long; first glume from one-fourth shorter to nearly as long as the spikelet, 5–7-nerved, broad, clasping, acuminate; second glume and sterile lemma subequal, 5–7-nerved; fertile lemma 2 mm. long, elliptic, smooth and shining.

BRITISH NEW GUINEA: ? Division: Kuba Kuba, *MacGregor 18* (US); Western Division: Daru Island, *Brass 6350* (A, US) (on swampy ground in savannah forest); Mabaduan, *Brass 6568* (A, TYPE, US) (sporadic on damp soil in savannah forest).

Endemic.

Closely related to *Panicum mindanaense* Merr., from which it differs in being much coarser and taller, with longer and broader leaves and larger spikelets.

13. **Panicum sarmentosum** Roxb., Hort. Beng. 8. 1814, nomen, Fl. Ind. 1: 311. 1820, descr.; K. Schum. and Lauterb., Fl. Deutsch. Schutzgeb. Südsee 179. 1901. Type from Sumatra.

Panicum incomtum Trin., Gram. Pan. 200. 1826, Sp. Gram. Ic. 2: *pl. 232.* 1829; Chase, Jour. Arnold Arb. 20: 311. 1939. Type from the Philippines.

Perennial; culms branching, woody, scandent or rambling, 1 to several meters long (up to 15 meters ex auct.), glabrous or somewhat pubescent, especially below the panicle; sheaths shorter than the internodes, nearly glabrous to rather densely pubescent, especially on the collar, apparently becoming glabrous in age; ligule a ring of tawny hairs scarcely 1 mm. long; blades glabrous to more or less pubescent, linear-lanceolate, 12–30 cm. long, 8–25 mm. wide, acuminate, the base abruptly narrowed at the junction with the sheath; panicle open, 15–30 cm. long, the main axis erect, pubescent or villous, the branches terete, spreading, often very diffuse and implicate, sometimes viscid; spikelets ovoid, about 2 mm. long, obtuse or subacute, glabrous or with a few short hairs near the tip of the glumes and sterile lemma; first glume half the length of the spikelet or more, acute, 3-nerved; second glume and sterile lemma equal, 5-nerved, the sterile lemma with a palea about two-thirds its length; fertile lemma smooth and shining, angled on the back, brown at maturity.

British New Guinea: Central Division: Mafulu, alt. 1250 m., *Brass 5208* (US) (rambling grass in secondary forest); Koitaki, *Carr 12525* (NY) (edge of forest); Western Division: Lake Daviumbu, Middle Fly River, *Brass 7957* (A, US) (large entangling grass in old village clearings); Mt. Musgrave, *MacGregor 41* (US); ? Division: Lone Range, *Chalmers 72* (US); Without precise locality: *Chalmers 42* (US); *Hartman 73* (US); *MacGregor 12* (US). Northeast New Guinea: Morobe District: *Clemens 4303* (A).

Indo-Malayan region, New Guinea, and Australia.

Roxburgh based his description on plants growing in the Calcutta Botanical Garden, where the species had been introduced from Sumatra. Chase (17, p. 311) and J. Ohwi (56, p. 5) take up the name *Panicum incomtum* Trin. (described from the Philippines) for the New Guinea plants. Chase (loc. cit.) states: "*Panicum sarmentosum* Roxb., described from Sumatra, has a larger much more open panicle than *P. incomtum*, the panicle branches not viscid. It is far less common and less widely distributed than *P. incomtum*." Study of numerous specimens from the Indo-Malayan region does not support the view that these two species are distinct. There is nothing in the size or structure of the spikelets that would serve to separate two species from the complex, and the panicles vary from open and with spreading branches to more contracted with the branches more or less implicate. There seem to be all degrees of variation between these two extremes. The viscid panicle branches are not always associated with the implicate character. From the evidence at hand it seems to the writer that we have here not two species, one with a wide range, the other rather restricted, as Mrs. Chase suggested, but rather one wide-ranging polymorphic species.

14. **Panicum Archboldii** Hitchc., Brittonia 2: 121. 1936. Type from New Guinea.

Perennial; culms erect, stiff, hard, glabrous, about 1.5 meters tall; sheaths glabrous, shorter than the internodes, somewhat keeled, especially

toward the summit; ligule membranous, about 0.5 mm. long; blades glabrous, erect or ascending, flat to involute, 10–25 cm. long, 3–6 mm. wide; panicle erect, contracted, 10–25 cm. long, the axis angled, scabrous, the main branches slender, appressed, distant but more or less overlapping, the lower as much as 9 cm. long, bearing short-pediceled, closely arranged spikelets mostly toward one side, the branches and terete pedicels minutely scabrous; spikelets 2 mm. long, glabrous, oblong-elliptic; first glume ovate, acute, 5-nerved, less than half as long as the spikelet; second glume and sterile lemma equal, 5-nerved, the lemma with a much reduced hyaline palea; fertile lemma chartaceous-indurate, stramineous, acute.

BRITISH NEW GUINEA: Western Division: Dagwa, Oriomo River, alt. 40 m., *Brass 5923* (US, TYPE COLL.) (shallow margins of a large lagoon); Daru Island, *Brass 6342* (A, US) (occasional pure stands in swampy savannah forests); Mabaduan, *Brass 6484* (A, US) (common in dense grass cover of old garden lands).

Sumatra and New Guinea.

The original description of this species states that the blades are 5–15 cm. long and that the spikelets are loosely arranged on the panicle branches. Examination of a duplicate of the type specimen shows that the blades are, rather, 10–22 cm. long, and that the spikelets are very densely arranged on the panicle branches.

15. **Panicum marginatum** R. Br., Prodr. Fl. Nov. Holl. 1: 190. 1810; Trin., Sp. Gram. Ic. 2: *pl. 209*. 1829; Chase, Jour. Arnold Arb. 20: 312. 1939. Type from Australia.

Entolasia marginata (R. Br.) Hughes, Kew Bull. 1923: 331. 1923.

Perennial; culms ascending or spreading, sparingly branching below, 40–90 cm. tall, essentially glabrous; sheaths distinctly shorter than the internodes, glabrous to rather densely papillose-pilose (sometimes only papillose); ligule a row of hairs about 1 mm. long; blades mostly 3–9 cm. long, 2–6 mm. wide (often much reduced, especially on the basal sheaths), scabrous to more or less pubescent, the base narrowed into a short brownish petiole-like base; panicle erect, contracted, 3–8 cm. long; spikelets glabrous, 3–3.5 mm. long, about 1 mm. wide; first glume about 0.5 mm. long, hyaline and nerveless; second glume and sterile lemma equal, membranous, 5-nerved; fertile lemma and palea white-sericeous.

BRITISH NEW GUINEA: Western Division: Tarara, Wassi-Kussa River, *Brass 8654* (A, US) (forming a wiry, tangled groundcover in riverbank dry scrub).

Australia and New Guinea.

2. **Brachiaria** (Trin.) Griseb.

Brachiaria (Trin.) Griseb. in Ledeb., Fl. Ross. 4: 469. 1853.

Panicum section *Brachiaria* Trin., Mém. Acad. St. Petersb. VI. Sci. Nat. 3(2): 194. 1834.

Spikelets dorsally compressed, solitary or in pairs, alternate in two rows along one side of a trigonal or narrowly winged rachis, the back of the fertile lemma turned away from it; first glume one-third to half as long as the spikelet; second glume and sterile lemma similar, 5–7-nerved, the lemma usually with a palea and sometimes bearing a staminate flower; fertile lemma indurate, dorsally convex, obtuse, acute, or mucronate, smooth or rugose, the margins inrolled. Annuals or perennials with terminal panicles of two to several spikelike racemes racemose along a main axis.

TYPE SPECIES: *Brachiaria eruciformis* (J. E. Smith) Griseb. (*Panicum eruciforme* J. E. Smith).

KEY TO THE SPECIES

1. First glume clasping the base of the spikelet, the margins overlapping; fertile lemma transversely rugose.....1. *B. subquadripara.*
1. First glume not clasping the spikelet; fertile lemma papillose-rugose.
   2. Spikelets about 2.5 mm. long, acute; fertile lemma not mucronate.....2. *B. coccosperma.*
   2. Spikelets about 3 mm. or more long, acuminate or awned; fertile lemma mucronate.
      3. Spikelets silky-sericeous; sterile lemma awned.....4. *B. holosericea.*
      3. Spikelets not silky-sericeous (sometimes with a few silky hairs at apex); sterile lemma awnless.....3. *B. fusiformis.*

1. **Brachiaria subquadripara** (Trin.) Hitchc., Lingnan Sci. Jour. 7: 214. 1929; Chase, Jour. Arnold Arb. 20: 308. 1939.

Panicum subquadriparum Trin., Gram. Pan. 145. 1826, Sp. Gram. Ic. 2: *pl. 186.* 1829. "Inss. Marian. Ind. or."

Panicum miliiforme Presl, Rel. Haenk. 1: 300. 1830; Scribn., Missouri Bot. Gard. Rep. 10: 47. *pl. 20.* 1899. Type from Luzon, Philippines.

Brachiaria miliiforme (Presl) Chase, Contr. U. S. Nat. Herb. 22: 35. 1920.

Culms slender, straggling or suberect, the ascending branches 20–60 cm. tall; sheaths mostly shorter than the internodes, rather loose, glabrous or somewhat pubescent, the margins usually more or less ciliate; ligule a row of hairs about 1 mm. long; blades 5–17 cm. long, 4–10 mm. wide, glabrous or sparsely pilose, the margins scabrous; racemes 3–6, spreading, rather distant along the glabrous or sparsely hairy axis, the rachis flattened, glabrous or sometimes with stiff hairs; spikelets 3–4 mm. long, glabrous, acute, solitary, subsessile on the rachis; first glume about 1.5 mm. long, clasping the base of the spikelet, the margins overlapping; second glume 7-nerved; sterile lemma 5-nerved, equaling the second glume, sometimes enclosing a hyaline palea; fertile lemma pale, transversely rugose.

BRITISH NEW GUINEA: Western Division: Daru Island, *Brass 6301* (A, US) (common as a weed in native gardens); Northern Division: Oro Bay, *Reeder 841* (A, US) (growing thickly in sand along seashore, just above high tide mark). NETHERLANDS NEW GUINEA: Waren, 50 miles south of Manokwari, *Kanehira & Hatusima 14144* (A).

This species has been referred to *Panicum distachyon* L. of India, a smaller species with ovate-lanceolate blades in which the racemes are usually two and the peduncle is pilose near the summit.

1a. **Brachiaria subquadripara** (Trin.) Hitchc. var. **piligera** (F. Muell. ex Benth.) comb. nov.

Panicum piligerum F. Muell. ex Benth., Fl. Austral. 7: 477. 1878. Type from Australia.

Brachiaria piligera (F. Muell. ex Benth.) Hughes, Kew Bull. 1923: 315. 1923.

Differs from the species in having the second glume and sterile lemma pubescent. The first glume is glabrous.

BRITISH NEW GUINEA: Central Division: Hisiu, *Carr 11398* (NY) (open places near the seashore; grass about two feet tall).

2. **Brachiaria coccosperma** (Steud.) Stapf ex Backer, Handb. Fl. Java 2: 147. 1928. (As synonym of *Panicum coccospermum* Steud.)

Panicum coccospermum Steud., Syn. Pl. Glum. 1: 62. 1854. Type from India.

Annual; culms slender, usually decumbent and branching below, 10–35 cm. tall, subglabrous to more or less pubescent, the nodes white-bearded; sheaths usually shorter than the internodes, sparsely to densely woolly-pubescent, the margins ciliate; ligule a row of white hairs about 0.3 mm. long; blades ovate-lanceolate, subcordate, 1–4 cm. long, 3–10 mm. wide, soft-pubescent on both surfaces, one of the margins undulate, the other pectinate-scabrous; racemes 4–8, 1–3 cm. long, the rachis more or less pubescent, scabrous on the angles; pedicels solitary above, often paired below, short, more or less pubescent and bearing stiff hairs as much as 0.5 mm. long; spikelets glabrous to densely soft-pubescent, about 2.5 mm. long; first glume 3-nerved, about half as long as the spikelet, acute; second glume and sterile lemma equal, acute, 5-nerved, the lemma enclosing a well developed palea but no flower; fertile lemma pale, elliptic, longitudinally striate and minutely papillose-rugose.

NORTHEAST NEW GUINEA: Morobe District: Wantoat, *Clemens* (sine coll. no.), Feb. 21, 1940 (US). [Form with glabrous spikelets.]

This species is variable in that the spikelets may vary from glabrous to rather densely pubescent. The foliage also varies in this respect, but to a lesser degree.

Some authors have considered this species as a synonym of *Brachiaria villosa* (Lam.) A. Camus (*Panicum villosum* Lam., Tabl. Encycl. 1: 173. 1791), but that species has obtuse glumes, a sterile lemma enclosing a well developed staminate flower, and both sterile and fertile lemmas mucronate. The tip of the fertile lemma is scabrous and clothed with white hairs on the margin near the apex.

3. **Brachiaria fusiformis** sp. nov. PLATE I.

Annua, 15–40 cm. alta; culmis gracilibus, glabris vel plus minusve pubescentibus, adscendentibus vel decumbentibus, nodis pubescentibus eis inferioribus radicantibus; vaginis quam internodiis fere brevioribus, plus minusve pubescentibus, callo et marginibus dense pilosis; ligula ad ciliarum seriem fere 0.6 mm. longam reducta; laminis ovato-lanceolatis, subcordatis, 1.5–3.5 cm. longis, 3–7 mm. latis, glabris vel plus minusve puberulentibus, alter margine undulato, alter pectinato-scabro; racemis 3–10, 0.5–2 cm. longis, rhachi angulata, puberulente et pilis paucis rigidis praedita; pedicellis solitariis, 0.5–1 mm. longis, puberulentibus et apicem versus pilis rigidibus obtectis; spiculis fusiformibus, circiter 3 mm. longis, pilosis, apicem versus pilis paullo longioribus; gluma prima acuta, 3-nervia, quam spicula duplo breviore; gluma secunda et lemmate sterili subaequantibus, 5-nervis, acuminatis, lemmate quam gluma paullo longiore; palea sterili angusta, scariosa; lemmate fertili striata papillis ordinibus dispositis.

BRITISH NEW GUINEA: Central Division: Rona, Laloki River, alt. 450 m., *Brass 3639* (GH, TYPE, US) April, 1933 (common on rocky savannah slopes).

Some additional specimens in the U. S. National Herbarium which seem to represent this same species are: Luzon: Viscaya Province: *M. Ramos* [Philip. Bur. Sci. No. 8214]; *Clemens 18000;* Benguet Province: *R. S. Williams 1963;* Lepanto District, *Merrill 4459.*

The new species is related to *Brachiaria coccosperma,* but that species has shorter, acute spikelets with the fertile floret elliptic and acute rather than obovate and distinctly mucronate. This is the species reported as *B. villosa* (Lam.) A. Camus, by Hitchcock (35, p. 121).

4. **Brachiaria holosericea** (R. Br.) Hughes, Kew Bull. **1923:** 315. 1923; Hitchc., Brittonia 2: 121. 1936.

Panicum holosericeum R. Br., Prodr. Fl. Nov. Holl. 1: 190. 1810; Trin., Sp. Gram. Ic. 2: *pl. 173.* 1829. Type from Australia.

Culms erect from a branching base, 40–60 cm. tall, glabrous or sparsely pubescent, the nodes densely villous; sheaths, at least the lower, overlapping, sparsely stiff-pilose, densely so along the margins; ligule a row of stiff hairs about 1.5 mm. long; blades lanceolate, 3–5 cm. long, 3–5 mm. wide, stiff-pilose on both surfaces, the margins slightly scaberulous; racemes mostly 5–7, about 1 cm. long, the rachis angled; spikelets short-pediceled, 3–3.5 mm. long, densely sericeous, the long silky hairs on the upper part widely spreading at maturity; first glume acute, about 1.5 mm. long, 3-nerved, the lateral nerves obscure; second glume acuminate, about 2.5 mm. long exclusive of the hairs, 5-nerved, the hairs on the upper half as much as 2 mm. long; sterile lemma similar to the second glume in size and indument, but terminating in a short awn equaling but rarely exceeding the apical hairs; fertile lemma mucronate, longitudinally striate, about 2 mm. long.

British New Guinea: Western Division: Dagwa, Oriomo River, *Brass 5910* (GH, US) (common on damp ridge slopes); Lake Daviumbu, Middle Fly River, *Brass 7810* (A, US) (occasional in savannah grass cover).

Australia and New Guinea.

3. Ichnanthus Beauv.

Ichnanthus Beauv., Ess. Agrost. 56. *pl. 12, fig. 1.* 1812.

Spikelets as in *Panicum,* but more or less laterally compressed, the glumes and sterile lemma strongly nerved; first glume from half to nearly as long as the spikelet; second glume and sterile lemma equal or subequal, the lemma enclosing a palea and sometimes a staminate flower; fertile lemma dorsally compressed, chartaceous-indurate, short-stipitate and bearing on either side membranous appendages adnate to the base of the lemma or these reduced or indicated by minute excavations only (our species has only excavations). Weak-stemmed, rather broad-leaved grasses with short-pediceled spikelets in open or somewhat contracted panicles.

Type species: *Ichnanthus panicoides* Beauv.

1. **Ichnanthus vicinus** (F. M. Bailey) Merr., Enum. Philip. Fl. Pl. 1: 70. 1922; Ohwi, Bot. Mag. (Tokyo) 56: 5. 1942.

Panicum vicinum F. M. Bailey, Syn. Queensl. Fl. Suppl. 3: 82. 1890. Type from Australia.

Panicum nitens Merr., (Philip.) Gov. Lab. Bur. Bull. 17: 8. 1904. (non Schum. 1901). Type from the Philippines.

Culms weak, decumbent at base and rooting at the nodes, the upright branches 15–50 cm. tall; sheaths usually slightly shorter than the internodes, glabrous or more or less pubescent, villous on the margins; ligule membranous-ciliate, about 1 mm. long; blades ovate to ovate-lanceolate, 3–8 cm. long, 1–2.5 cm. wide, subglabrous to somewhat stiff-puberulent; panicles terminal and axillary, open to somewhat contracted, as much as 15 cm. long, the branches slender, compound, scabrous; spikelets glabrous, or rarely more or less pilose, 3.5–5 mm. long, more or less laterally compressed, the glumes and sterile lemma strongly nerved; glumes unequal, 5-nerved, acuminate to short-aristate, scabrous on the keels at least toward

the tips; first glume about two-thirds as long as the spikelet and separated from the second by a distinct internode; second glume and sterile lemma equal or the lemma slightly shorter; sterile lemma 5-nerved, acute to acuminate, enclosing a palea and sometimes a staminate flower; fertile lemma chartaceous-indurate, 2–2.5 mm. long, obtuse, stipitate and bearing two scars above the base.

NORTHEAST NEW GUINEA: Morobe District: Salamaua, alt. about 100 m., *Clemens 4332* (A); alt. about 1000 m., *Clemens 41238* (US); Boana, alt. about 100 m., *Clemens 41808* (US). NETHERLANDS NEW GUINEA: Hollandia, alt. 50 m., *Brass 8909* (A, US) (abundant on shaded sandy banks in a moist ravine); 4 km. southwest of Bernhard Camp, Idenburg River, alt. 850 m., *Brass 13210* (A, US) (occasional on flooded rocky banks of river).

Southern Asia, East Indies, Philippines to New Guinea and Australia.

Very closely related to the American *Ichnanthus pallens* (Sw.) Munro ex. Benth. and perhaps should be included with that species. The spikelets of the Old World form are, in general, slightly larger and the glumes tend to be more aristate than in the American plants.

4. Echinochloa Beauv.

Echinochloa Beauv., Ess. Agrost. 53. *pl. 11, fig. 2.* 1812.

Spikelets more or less hispid, plano-convex, subsessile, in pairs or in irregular clusters along one side of the panicle branches; first glume about one-third to half the length of the spikelet, acute or mucronate; second glume and sterile lemma equal, the latter mucronate to long-awned, with a membranous palea and sometimes a staminate flower; fertile lemma indurate, slightly crested at the apex, smooth and shining, the margins inrolled, the tip of the palea usually free. Annual or perennial grasses with usually narrow panicles of several secund spikelike racemes.

TYPE SPECIES: *Echinochloa crusgalli* (L.) Beauv. (*Panicum crusgalli* L.).

KEY TO THE SPECIES

1. Ligule a dense row of hairs about 4 mm. long; sterile lemma enclosing a staminate floret; plants perennial.....3. *E. stagnina.*
1. Ligule wanting; sterile lemma empty, but with a membranous palea; plants annual.
   2. Spikelets about 2 mm. long, the awn of the sterile lemma reduced to a short point; racemes distant, 1–2 cm. long, the upper about as long as the lower.....1. *E. colonum.*
   2. Spikelets about 3 mm. long, the awn of the sterile lemma variable, but evident; racemes more or less approximate, usually more than 2 cm. long, the upper shorter than the lower.....2. *E. crusgalli.*

1. **Echinochloa colonum**[7] (L.) Link, Hort. Berol. 2: 209. 1833; Hitchc., Brittonia 2: 123. 1936; C. E. Hubb. and Vaughan, Grass. Maurit. and Rodriguez 69. *fig. 12.* 1940.

   Panicum colonum L., Syst. Nat. ed. 10. 2: 870. 1759; Trin., Sp. Gram. Ic. 2: *pl. 160.* 1829; K. Schum. and Lauterb., Fl. Deutsch. Schutzgeb. Südsee 178. 1901. Type from Jamaica.[8]

   Oplismenus colonus (L.) H.B.K., Nov. Gen. et Sp. 1: 108. 1815.

   Echinochloa crusgalli subsp. *colona* (L.) Honda, Bot. Mag. (Tokyo) 37: 122. 1923.

[7] For a discussion of the proper ending of the specific epithet, see Hitchc., Contr. U. S. Nat. Herb. 17: 256. 1913.

[8] See Hitchcock, Contr. U. S. Nat. Herb. 12: 119. 1908 and 22: 150. 1920.

Annual; culms glabrous, erect or decumbent, usually much branched at base, 20–80 cm. long; sheaths glabrous, shorter than the internodes, rather loose, somewhat keeled toward the summit; ligule wanting; blades rather lax, 6–15 cm. long, 3–8 mm. wide, glabrous to sparsely pubescent, the margins scabrous; panicle 5–15 cm. long, the axis and branches scabrous to puberulent; racemes simple, single or occasionally approximate, 1–2 cm. long; spikelets 2–3 mm. long, crowded, the glumes and sterile lemma glabrous to scabrous-puberulent, the nerves scabrous-hispid; first glume one-third to half as long as the spikelet, 3-nerved; second glume about equal to the sterile lemma, mucronate, 5-nerved; sterile lemma slightly exceeding the second glume, mucronate or awn-pointed, flattened on the back, enclosing a hyaline palea of equal length; fertile lemma rounded on the back, smooth and shining, obscurely 5-nerved, short-acuminate, the margins inrolled below, the apex of the palea not enclosed.

BRITISH NEW GUINEA: Central Division: Kanosia, *Carr 11022* (NY); Western Division: Strickland River, *W. Bauerlen 40* (US); Daru Island, *Brass 6044, 6300* (A, US). NORTHEAST NEW GUINEA: Morobe District: Markham Valley, Kajabit Mission, *Clemens 10476-S* (US); 4 miles south of Langemak Bay, *Sawyer 32, 52* (A).

Pantropic weed.

2. **Echinochloa crusgalli** (L.) Beauv., Ess. Agrost. 53, 161, 169. 1812; Chase, Jour. Arnold Arb. 24: 88. 1943.

Panicum crusgalli L., Sp. Pl. 56. 1753; Trin., Sp. Gram. Ic. 2: *pl. 161.* 1829; F. Muell., Pap. Pl. 2: 35. 1886. Type from Europe.

Annual; culms caespitose, erect or decumbent at base, 30–100 cm. tall; sheaths glabrous, rather loose, somewhat keeled, especially toward the summit; ligule wanting; blades linear, 10–40 cm. long, 5–15 mm. wide, the margins and upper surface usually scabrous; panicles 10–20 cm. long, erect or somewhat nodding, the axis scabrous and often somewhat papillose-hispid, the hairs often rather long; racemes appressed to spreading, 2–7 cm. long, simple or branching below, gradually shorter and more or less approximate upwards, the rachis scabrous and often papillose-hispid; spikelets about 3 mm. long, hispid on the nerves, the internerves scabrous to hispidulous; first glume one-third to half as long as the spikelet, acute; second glume about equaling the sterile lemma, acuminate to awn-pointed; sterile lemma mucronate-tipped or with an awn as much as 4 cm. long.

BRITISH NEW GUINEA: Western Division: Mainland opposite Daru Island, *Brass 6060* (GH, US) (common in outer shallows of a large coastal swamp); Lower Fly River, *Brass 8280* (A, US) (common on sandy foreshores); near the Dutch Boundary, *MacGregor 14* (US). NORTHEAST NEW GUINEA: Morobe District: *Clemens 4775* (A); Ogeramnang, alt. about 1700 m., *Clemens 5476* (A); near Kajabit Mission, *Clemens 10650* (US). NETHERLANDS NEW GUINEA: Balim River, alt. 1600 m., *Brass 11793, 11803* (A, US) (common in ditches); Rouffaer River, alt. 65 to 175 m., *Docters van Leeuwen 9709, 10167* (NY).

Widely distributed in the warmer regions of both hemispheres.

This species is extremely variable, and numerous subspecies, varieties, and forms have been recognized. The spikelets vary slightly in size, in the length of awn on the sterile lemma, and the degree of hispidness, the hairs being sometimes tuberculate-based. The cited specimens represent both awned and nearly awnless forms, but are similar in other respects. The spikelets are less hispid than those of many European and American

plants. *Brass 6060* was cited as *Echinochloa crus-pavonis* (H. B. K.) Schult. by Hitchcock (35, p. 123).

3. **Echinochloa stagnina** (Retz.) Beauv., Ess. Agrost. 53, 161, 171. 1812; Chase, Jour. Arnold Arb. 20: 312. 1939.
Panicum stagninum Retz., Obs. Bot. 5: 17. 1789. Type from Eastern India.

Perennial usually growing in deep water; culms rather succulent, stout, about 1 cm. in diameter, 2–? meters long, rooting from the nodes below the water level; sheaths rather loose, glabrous or sometimes ciliate on the margins; ligule a dense row of soft tawny hairs about 4 mm. long; blades 30–50 cm. long, 1–3 cm. wide, glabrous to scaberulous on both surfaces, the margins scabrous; panicle 20–50 cm. long, the axis and branches scabrous, the latter stiff-pilose at base, often somewhat branched, as much as 15 cm. long; spikelets about 4 mm. long, excluding the awns, crowded, short-pediceled, scabrous, the nerves hispid; first glume one-third to half as long as the spikelet, acute, often ciliate; second glume about equaling the sterile lemma, long-acuminate or short awn-pointed, the margins sometimes ciliate; sterile lemma flattened on the back, enclosing a palea and a staminate flower, awned from the tip, the awn 2 mm. or more long; fertile lemma 3.5–4 mm. long, plano-convex, smooth and shining, acuminate, the margins inrolled below, the tip of the palea not enclosed.

BRITISH NEW GUINEA: Western Division: Fly River, about 30 miles below Everill Junction, *Brass 6585* (A, US). NORTHEAST NEW GUINEA: Sepik River, Nyamangai, *Herre 319* (NY). NETHERLANDS NEW GUINEA: Bernhard Camp, Idenburg River, alt. 50 m., *Brass 13785* (A, US).

India to the East Indies, Philippines and New Guinea. Also in tropical Africa. Coarse robust perennials of marshes and river banks, sometimes growing in water more than 2 meters deep. Often forming pure stands locally.

The description was drawn from New Guinea specimens which are, perhaps, more robust than usual. Small specimens may be distinguished from *E. crusgalli* by the larger spikelets and especially by the ligule; the ligule in *E. crusgalli* is wanting.

5. Oplismenus Beauv.

Oplismenus Beauv., Fl. Owar. 2: 14. *pl. 68, fig. 1.* 1809.
Orthopogon R. Br., Prodr. Fl. Nov. Holl. 1: 194. 1819.

Spikelets terete or somewhat laterally compressed, subsessile, solitary or in pairs, in two rows, crowded or approximate on one side of a narrow scabrous or hairy rachis, the back of the fertile lemma turned toward it; glumes subequal, awned, the awn of the first glume considerably longer than that of the second, often as long as or exceeding the length of the spikelet; sterile lemma empty or rarely enclosing a staminate flower, longer than the glumes and fertile floret, awnless or short-awned, the awn rarely as much as 2 mm. long; sterile palea absent or when present narrow, hyaline, ciliate at apex, fertile lemma chartaceous-indurate, pale, smooth and shining, acute, usually minutely crested, sometimes short-awned, the awn as much as 0.6 mm. long, rarely longer. Freely branching creeping annuals or perennials of shady habitats with flat lanceolate blades and inflorescences of few to several alternate spikelike racemes racemose on the main axis, the racemes sometimes very short and the spikelets crowded

and appearing fascicled, or the racemes almost totally absent and the spikelets solitary or in twos or threes along the axis.

TYPE SPECIES: *Oplismenus africanus* Beauv. = *O. hirtellus* (L.) Beauv.

KEY TO THE SPECIES

1. Racemes 1.5–6 cm. long; sterile lemma awnless or nearly so.....1. *O. compositus.*
1. Racemes 0.2–1 cm. long; sterile lemma awned, the awn 0.5–1 mm. long.....2. *O. hirtellus.*

1. **Oplismenus compositus** (L.) Beauv., Ess. Agrost. 54, 168. 1812; K. Schum., Bot. Jahrb. 9: 196. 1887; Pilger, Nat. Pflanzenfam. ed. 2. 14e: 48. *fig. 25.* 1940.
Panicum compositum L., Sp. Pl. 57. 1753; F. Muell., Pap. Pl. 1: 31, 74. 1876. Type from Ceylon.

Culms up to 1 meter long, decumbent at base and rooting from the lower nodes; sheaths shorter than the internodes, glabrous to rather densely papillose-pilose, the margins ciliate; ligule hyaline, truncate, ciliate above; blades lanceolate to ovate-lanceolate, 5–15 cm. long, 1–2 cm. wide, rarely wider, subglabrous to pilose, usually more densely hairy below, the margins often undulate; racemes usually densely flowered, 1.5–6 cm. long or longer; spikelets glabrous to pilose, terete or nearly so; glumes subequal, 1.5–3 mm. long excluding the awns; awn of the first glume 2–8 mm. long, that of the second 0.3–1.5 mm.; sterile lemma exceeding the glumes, 3–4 mm. long, awnless or nearly so, usually enclosing a narrow hyaline palea about equal to the lemma, and rarely also a staminate flower; fertile lemma smooth and shining, 2.5–3 mm. long, the apex with a minute laterally compressed crest which may appear as a minute mucro in dorsal or ventral view especially when immature.

BRITISH NEW GUINEA: Northern Division: Soputa, *DeKalb Russell Jr.* in 1943 (US). NORTHEAST NEW GUINEA: Morobe District: Markham Valley, Kajabit, *Clemens 10568* (US); Finschhafen, *Weinland 279* (US); without precise locality, *Rodatz & Klink 69* (US). NEW BRITAIN: Talasea, near Bitokara Mission, *Burcham 137* (US).

Widely distributed in the tropics of the Old World.

2. **Oplismenus hirtellus** (L.) Beauv., Ess. Agrost. 54, 168. 1812; Stapf in Prain, Fl. Trop. Afr. 9: 631. 1920; Hitchc., Proc. Linn. Soc. N. S. Wales 54: 146. 1929.
Panicum hirtellum L., Syst. Nat. ed. 10. 2: 870. 1759; Sp. Pl. ed. 2. 83. 1763. Type from Jamaica.
Oplismenus africanus Beauv., Fl. Owar. 2: 15. *pl. 68, fig. 1.* 1809. Type from West Africa.
Oplismenus aristulatus Burcham, Contr. U. S. Nat. Herb. 30: 419. *fig. 1.* 1948. Type from New Britain.

Slender creeping branching perennial, the ascending flowering culms 20–40 cm. tall; sheaths mostly shorter than the internodes, glabrous to papillose-pilose, the margins and collar densely pubescent-ciliate; ligule membranous, truncate, erose, ciliate, the hairs often equaling the membrane; blades lanceolate, narrowed at the base, 3–10 cm. long, 5–10 (rarely to 16) mm. wide, the margins usually undulate, glabrous or scabrous to variously pubescent, usually more densely so on the lower surface, the hairs sometimes papillose-based; racemes distant, 2–10 mm. long (in our specimens), densely flowered, the spikelets often appearing fascicled, the narrow angled rachis scabrous to long stiff pilose; spikelets terete or somewhat laterally compressed, 3–4.5 mm. long excluding the

awns, sparsely to densely pubescent, the hairs sometimes papillose-based; glumes subequal, 2–3 mm. long; first glume awned from the tip, the awn 3–8 mm. long; second glume awned from the apex or slightly below it, the awn 0.5–3.5 mm. long, slightly more slender than that of the first glume; sterile lemma slightly exceeding the glumes, pubescent on the upper half especially toward the margins, the apex bearing a short awn 0.5–1 mm. long; sterile palea, when present, narrow, hyaline, 1.5–3 mm. long, the apex ciliate; fertile lemma pale, 2–3 mm. long, smooth and shining, faintly nerved, the apex with a minute laterally compressed crest which is sometimes prolonged into a mucro as much as 0.6 mm. long.

BRITISH NEW GUINEA: Central Division: Rona, Laloki River, alt. 450 m., *Brass 3647* (A, US) (common rain forest floor plant); Eastern Division: Mori River, *Brass 1534* (GH, US) (on forest paths); Western Division: Lake Daviumbu, Middle Fly River, *Brass 7483* (A, US) (abundant in light forest shade). NORTHEAST NEW GUINEA: Morobe District: Sarawaket, *Clemens 5756* (A); Dreger Harbor, near Finschhafen, *Reeder 868* (A, US) (in shade of bamboos). NETHERLANDS NEW GUINEA: 15 km. southwest of Bernhard Camp, Idenburg River, alt. 1600 m., *Brass 12364* (A, US) (rain-forest, one small clump in the stony bed of a stream); 4 km. southwest of Bernhard Camp, Idenburg River, alt. 850 m., *Brass 13719* (A, US) (on open sandy banks of a rain-forest stream); Waren, *Kanehira and Hatusima 13160* (A). NEW BRITAIN: Talasea, Bitokara Mission, *Burcham 138* (US) (under rain-forest, along trail).

Widely distributed in the tropics of both hemispheres.

A wide-ranging polymorphic species which is difficult to characterize. Perhaps the best character for recognizing this species is the short-awned sterile lemma of the spikelets which are arranged in short racemes racemose along a main axis, the rachis varying from 2 mm. to a centimeter or more in length, but rather uniform on one plant. Specimens with rather long racemes may be distinguished from *Oplismenus compositus* with a fair degree of accuracy, since that species has an awnless sterile lemma. In other respects the spikelets are very similar. Some of the New Guinea plants look very much like *O. setarius* (Lam.) Roem. and Schult. and have been so reported by the early German workers. Typical *O. setarius* from the New World, however, usually has smaller leaves and slightly smaller spikelets, but the reasons for considering it as distinct from *O. hirtellus* are not altogether convincing, as there seem to be numerous intergrades. Stapf (in Prain, Fl. Trop. Afr. 9: 632. 1920) does not consider it distinct. Some of the cited specimens have been referred to *O. undulatifolius* (Ard.) Roem. and Schult. (see Hitchc., Brittonia 2: 123. 1936) and to *O. undulatifolius* var. *imbecillis* (R. Br.) Hack. (see Ohwi, Bot. Mag. (Tokyo) 56: 7. 1942). Typical *O. undulatifolius*, however, has characteristically spreading-pilose sheaths, and the inflorescence consists of rather long racemes below, which become progressively shorter upward until the spikelets are borne singly or in only twos or threes on the upper part of the axis. *Oplismenus undulatifolius* var. *imbecillis* (based on *Orthopogon imbecillis* R. Br. from Australia) has very much reduced racemes, the spikelets being borne singly or in small groups on the main axis, the sterile lemma is awnless, and the awn of the second glume is much reduced.

One of the cited specimens (*Burcham 138*) has been designated the type of a new species (*Oplismenus aristulatus* Burcham), based primarily on the mucronate character of the fertile lemma. The spikelets are densely pubescent, borne in short racemes, the rachis of which is 2–6 mm. long, and the blades are up to 10 cm. long and 15 mm. wide. The validity of this species seems doubtful, however, when it is seen that the fertile lemmas are crested throughout the genus and the crest may extend as a mucro or even a short awn in vastly different appearing plants. Some Philippine specimens (see *Philip. Bur. Sci. No. 30286*, collected by M. Ramos in 1917, and *Elmer 17105*) have blades only 2–5 cm. long and 3–7 mm. wide and nearly glabrous spikelets, but the fertile lemma has an awn fully as long as the Burcham specimen. On the other hand a Japanese specimen (Nat. Herb. No. 1130009) which resembles in many respects the figure accompanying the original description of *O. undulatifolius*, has blades as much as 8 cm. long and 2 cm. wide, and lower racemes up to 10 mm. long, but the fertile lemma bears an awn about 0.5 mm. long. A specimen from Formosa (*Beattie and Kurihara 10393*) has the long racemes (up to 8 cm. long) of *O. compositus* but the fertile lemma bears an awn 0.2–1 mm. long. Other cases could be cited. Another interesting specimen (*Millspaugh 2679*) from Japan may help to evaluate the importance of the awned fertile lemma as a specific character. In this specimen the same raceme was found to have some of the lemmas completely awnless, while others had awns fully 1 mm. long. In view of the above evidence, it seems undesirable to consider the mucronate to short-awned fertile lemma as at all unique, but rather as a potentiality which may appear anywhere in the genus.

6. Sacciolepis Nash

Sacciolepis Nash in Britton, Man. 89. 1901.

Spikelets oblong-conic, more or less oblique in profile, somewhat laterally compressed; first glume much shorter than the spikelet; second glume more or less inflated-saccate or gibbous on the back, strongly many-nerved; sterile lemma equaling the second glume but fewer-nerved and with a reduced hyaline palea; fertile lemma dorsally compressed, stipitate, elliptic, chartaceous-indurate, the margins inrolled. Plants of damp habitats with dense contracted, spikelike panicles.

TYPE SPECIES: *Sacciolepis striata* (L.) Nash (*Holcus striatus* L., *Panicum gibbum* Ell.).

KEY TO THE SPECIES

1. Spikelets 1.5–2 mm. long, only slightly gibbous; fertile floret nearly as long as the spikelet ..... 1. *S. myosuroides.*
1. Spikelets 2–3.5 mm. long, strongly gibbous; fertile floret only about half as long as the spikelet ..... 2. *S. indica.*

1. **Sacciolepis myosuroides** (R. Br.) Chase ex A. Camus in Lecomte, Fl. Gén. Indo-Chine 460. 1922; Blatter and McCann, Imp. Council Agric. Res. Sci. Monogr. 5: *pl. 107*. 1935; Hitchc., Brittonia 2: 123. 1936.

   Panicum myosuroides R. Br., Prodr. Fl. Nov. Holl. 1: 189. 1810. Type from Australia.

Panicum phleiforme Presl, Rel. Haenk. 1: 310. 1830; Hack., Bot. Jahrb. 13: 258. 1890; Scribn., Missouri Bot. Gard. Rep. 10: 47. *pl. 21.* 1899. Type from the Philippines.

Hymenachne myosuroides (R. Br.) Balansa, Jour. de Bot. 4: 143. 1890.

Culms erect or somewhat decumbent and rooting at the lower nodes, the upright or ascending portion 15–110 cm. tall; sheaths glabrous, mostly shorter than the internodes, subcompressed with scarious margins; ligule membranous, ciliate, about 1 mm. long; blades flat to subinvolute, as much as 20 cm. long, 2–4 mm. wide, glabrous or somewhat scabrous on the margins; panicle densely flowered, much contracted, spikelike, 5–20 (rarely 30) cm. long; spikelets obtuse to subacute, glabrous or sparsely pubescent toward the tip, 1.5–2 mm. long; first glume about one-third to half as long as the sterile lemma, only very slightly gibbous on the back, 7–9-nerved; sterile lemma 7-nerved, similar to the second glume but with a reduced hyaline palea; fertile floret nearly as long as the spikelet.

BRITISH NEW GUINEA: Western Division: Dagwa, Oriomo River, alt. 45 m., *Brass 6029* (A, US) (scattered in shallows of a lagoon on savannah); Middle Fly River, Lake Daviumbu, *Brass 7854* (A, US) (growing in shallow water on wet grass plains). NORTHEAST NEW GUINEA: Morobe District: Boana, alt. 800–1300 m., *Clemens 41356a* (US).

Tropical Africa and Asia to Australia and Polynesia.

Related to *Sacciolepis indica*, but may be distinguished by its smaller obtuse to subacute spikelets with the second glume only slightly gibbous on the back. The spikelets of *S. indica* are acuminate and strongly gibbous.

2. **Sacciolepis indica** (L.) Chase, Proc. Biol. Soc. Wash. 21: 8. 1908; Hitchc., Brittonia 2: 122. 1936.

Aira spicata L., Sp. Pl. 63. 1753 (non op. cit. 64); *Aira indica* L., Sp. Pl. (in errata). 1753. Type from India.

Panicum indicum L., Mant. 2: 184. 1771; Trin., Sp. Gram. Ic. 2: *pl. 197.* 1829; Pilger, Bot. Jahrb. 52: 171. 1914. Type from India.

Panicum contractum Wight and Arn., Linnaea 10: Litt. 117. 1836. Type from India.

Neurachne Peekelii Lauterb., Bot. Jahrb. 45: 356. 1911. Type from New Ireland.[9]

Sacciolepis contracta (Wight and Arn.) Hitchc., Mem. Bishop Mus. 8: 199. *fig. 90.* 1922; Chase, Jour. Arnold Arb. 24: 87. 1943.

Culms erect or creeping, often densely tufted, simple or branching, 10–150 (commonly 30–60) cm. tall; sheaths shorter than the internodes, somewhat keeled toward the summit, glabrous to more or less densely papillose-pubescent; ligule membranous, about 0.5 mm. long; blades flat to loosely involute, as much as 25 cm. long, 2–5 (rarely up to 8) mm. wide, glabrous to more or less pubescent; panicle long-exserted, 1–15 cm. long, the axis and terete discoid-tipped pedicels glabrous; spikelets 2–3.5 mm. long, glabrous to rather densely papillose-hispid (usually with at least a few hairs near the tip); first glume one-third to two-thirds as long as the spikelet, 3–7-nerved, the margins scarious; second glume strongly gibbous on the back, about 9–11-nerved; sterile lemma equal to the second glume and similar to it but not gibbous and with a poorly developed hyaline palea; fertile lemma about half as long as the spikelet.

[9] The type was not seen, but Pilger (Bot. Jahrb. 52: 171. 1914) says that it represents *Panicum indicum* L. [*Sacciolepis indica* (L.) Chase].

British New Guinea: Central Division: Urunu, Vanapa Valley, alt. 1900 m., *Brass 4789* (GH, US) (a common erect grass on open grassland); Mafulu, alt. 1250 m., *Brass 5483* (GH, US) (rare on roadsides and in grasslands); Western Division: Wuroi, Oriomo River, *Brass 5744* (US), *5827* (GH, US) (rare on damp soil on savannah); Palmer River, 1 mile above junction Black River, alt. about 100 m., *Brass 6961* (A, US) (on gravel bar); Lake Daviumbu, Middle Fly River, *Brass 7519* (A, US) (tufted on patches of hard pan in savannahs), *Brass 7880* (A, US) (occasional on hummocks of wet grass plains); Gaima, Lower Fly River, *Brass 8351* (A, US) (sporadic in open savannah forest); Tarara, Wassi Kussa River, *Brass 8713, 8776* (A, US) (savannah forest ridges); Northern Division: About 3 miles south of Dobodura, *Reeder 823, 825, 847* (A, US) (low, wet ground). Northeast New Guinea: Morobe District: Yunzaing, alt. about 1000 m., *Clemens 4053* (US); Sattelberg, alt. 100 m., *Clemens 4315* (A); Wantoat, elev. 1000–2000 m., *Clemens 10955 bis* (US); alt. 80–1200 m., *Clemens 41356a* (US); four miles south of Langemak Bay (near Finschhafen), *Sawyer 143* (A). Netherlands New Guinea: 9 km. northeast of Lake Habbema, alt. 2800 m., *Brass 10736* (A, US) (several suberect tufts about 80 cm. tall on a native clearing in the forest); 18 km. northeast of Lake Habbema, Bele River, alt. 2200 m., *Brass 11524* (A, US) (plentiful on old garden lands); Balim River, alt. 1600 m., *Brass 11824* (A, US) (plentiful on sandy, long deforested slopes); Nassau Region, Explorat Biv., alt. 1200 m., *Docters van Leeuwen 10809* (GH); Utakwa Expedition to Mt. Carstensz, Camp VI, alt. about 1000 m., *Kloss* in 1913 (US); Angi, Arfak Mountains, alt. 1900 m., *Kanehira & Hatusima 13826* (A).

The type specimen in the Linnaean Herbarium is a delicate creeping or spreading plant with many short spikes (about 1 cm. long) of only a few spikelets.[10] Among the specimens cited above, *Brass 5824* is most nearly like the type. The species is an extremely variable one, however, and all variations may be seen from small glabrous plants (only about 10 cm. tall) to tall pubescent plants (150 cm. or more in height). The spikelets themselves vary from glabrous to densely papillose-pubescent, but all show the characteristic form and structure. There seems to be no correlation between the pubescence on the spikelets and that on the rest of the plant. While *Reeder 825* and *847* (the tallest and most hairy of the specimens cited) appear at first to be distinct, critical study shows that there is no reliable character by which they may be separated. In view of the numerous intergrades between these tall hairy plants and the glabrous ones, it seems advisable to consider all the above-cited specimens as conspecific and members of an extremely polymorphic species (*S. indica*) in which even varieties can be separated in only the most arbitrary manner.

7. Pseudechinolaena (Hook. f.) Stapf

Pseudechinolaena (Hook. f.) Stapf in Prain, Fl. Trop. Afr. 9: 494. 1919.
Panicum sect. *Pseudechinolaena* Hook. f., Fl. Brit. Ind. 7: 28, 58. 1896.

Spikelets obliquely ovoid, laterally compressed and usually conspicuously gaping, in pairs or more often solitary on a narrow rachis of spikelike, racemosely arranged racemes, the back of the fertile lemma turned away from the rachis; glumes about equal or the first somewhat shorter;

[10] From data recorded by A. S. Hitchcock after examination of the type in 1907. Prof. Hitchcock's notebooks are preserved in the Hitchcock-Chase Agrostological Library at the Smithsonian Institution.

first glume 3-nerved, flat, smooth or scabrous along the midnerve; second glume 7-nerved, gibbous and more or less uncinate-spiny at maturity; sterile lemma as long as the spikelet, obscurely nerved, smooth or minutely tuberculate under a lens, enclosing a palea and sometimes a staminate flower; fertile lemma somewhat laterally compressed, indurate, smooth and shining, the margins clasping the palea but not inrolled. Weak-stemmed annuals with broad thin leaves and short few-flowered panicles.

TYPE AND ONLY SPECIES: *Pseudechinolaena polystachya* (H.B.K.) Stapf (*Echinolaena polystachya* H.B.K.).

1. **Pseudechinolaena polystachya** (H.B.K.) Stapf in Prain, Fl. Trop. Afr. 9: 495. 1919, Hook. Ic. 31: *pl. 3094*. 1922.

Echinolaena polystachya H.B.K., Nov. Gen. et Sp. 1: 119. 1815. Type from Colombia.

Panicum uncinatum Raddi, Agrost. Bras. 41. 1823. Type from Brazil.

Culms creeping and rooting at base, 40–60 cm. long, prominently striate and sparsely pubescent; sheaths shorter than the internodes, more or less pubescent, ciliate along the margins; ligule membranous, 1–2 mm. long, often ciliate; blades thin, ovate-lanceolate, 3–6 cm. long, 1–1.5 cm. wide, sparsely appressed-pubescent, the hairs stiff; racemes few to several, erect or ascending, loosely flowered, racemose along a main axis, the rachis narrow, scabrous; spikelets about 5 mm. long.

NORTHEAST NEW GUINEA: Morobe District: Sattelberg, alt. 1000 m., *Clemens 662* (A, US); near Kajabit Mission, alt. about 300 m., *Clemens 40800* (US); Boana, alt. about 800 m., *Clemens 41591* (US).

Shady habitats in the tropics of both hemispheres.

8. Cyrtococcum Stapf

Cyrtococcum Stapf in Prain, Fl. Trop. Afr. 9: 745. 1920.

Spikelets laterally compressed, obliquely obovate, in open or somewhat contracted panicles; glumes unequal, membranous, 3-nerved, the first smaller, the second cymbiform and nearly as long as the spikelet; sterile lemma 5-nerved, equaling the spikelet and with a reduced palea (this sometimes wanting); fertile lemma indurate, strongly gibbous on the back and with a small crest near the tip, the margins inrolled and clasping a narrow, convex palea. Annual or perennial grasses of shady habitats, with thin, lanceolate blades and creeping culms.

TYPE SPECIES: *Cyrtococcum setigerum* (Beauv.) Stapf (*Panicum setigerum* Beauv.).

KEY TO THE SPECIES

1. Panicles contracted, the branches rather stout, angled.
   2. Spikelets glabrous; plants 20–40 cm. tall ..... 1. *C. oxyphyllum.*
   2. Spikelets hispid; plants low, 6–15 cm. tall ..... 2. *C. trigonum.*
1. Panicles diffuse, the branches capillary, terete ..... 3. *C. patens.*

1. **Cyrtococcum oxyphyllum** (Hochst. ex Steud.) Stapf, Hook. Ic. 31: sub *pl. 3096*. 1922.

Panicum oxyphyllum Hochst. ex Steud., Syn. Pl. Glum. 1: 65. 1854; Hitchc., Brittonia 2: 122. 1936. Type from India.

Panicum pilipes Nees and Arn. ex Buse in Miq., Pl. Jungh. 3: 376. 1854; K. Schum., Notizbl. Bot. Gart. Berlin 2: 93. 1898. Type from Java.

Panicum hermaphroditum Steud., Syn. Pl. Glum. 1: 67. 1854; Hack., Bot. Jahrb. 13: 259. 1890. Type from the Philippines.

Cyrtococcum pilipes (Nees and Arn. ex Buse) A. Camus, Bull. Mus. Hist. Nat. (Paris) 27: 118. 1921; Blatter and McCann, Imp. Council Agric. Res. Sci. Monogr. 5: *pl. 110*. 1935.

Culms glabrous, creeping, often somewhat flattened, the ascending flowering branches 20–40 cm. tall; sheaths shorter than the internodes, pubescent, ciliate on the margins, keeled, especially toward the summit; ligule membranous, about 1 mm. long; blades 3–10 cm. long, 5–10 mm. wide, pubescent, more densely so beneath, the upper surface often almost glabrous; panicle contracted, densely flowered, 4–10 cm. long, shortly exserted, the branches rather stout; spikelets about 1.8 mm. long, glabrous, the base subtended by a few fine hairs; fertile lemma short-stalked, strongly gibbous on the back, smooth and shining, but under a lens minutely longitudinally striate.

BRITISH NEW GUINEA: Eastern Division: Aisa River, *Brass 1423* (GH, US) (on shady forest paths); Central Division: Dieni, Ononge Road, alt. 500 m., *Brass 3820* (GH, US) (common on roadside); Kabuna, alt. 100 m., *Brass 5594* (GH, US) (plentiful on pathways in forest); Kanosia, *Carr 11171* (US) (clearing in forest), *Carr 11786* (US) (swampy land under *Hevea*); Brown River, *Carr 12941* (US) (river bank); Northern Division: About 2 miles north of Big Embi Lake, *Reeder 820* (A, US) (in partial shade on creek bank); Without precise locality: *Chalmers 59* (US). NORTHEAST NEW GUINEA: Morobe District: Finschhafen, *Weinland 278* (US). NEW BRITAIN: Near Bitokara Mission, Talasso, *Burcham 139* (US) (under rain-forest). SOLOMON ISLANDS: Bougainville: *Kajewski 2139* (GH); San Cristoval: *Brass 2732, 2857A* (GH).

Indo-Malayan region to New Guinea.

2. **Cyrtococcum trigonum** (Retz.) A. Camus, Bull. Mus. Hist. Nat. (Paris) 27: 118. 1921.

Panicum trigonum Retz., Obs. Bot. 3: 9. 1783; Hack., Bot. Jahrb. 13: 259. 1890. Type probably from India.

Culms slender, glabrous, creeping, the ascending flowering branches 5–15 cm. long; sheaths equaling or longer than the internodes (sometimes slightly shorter), glabrous except for the long-ciliate margins; ligule membranous, decurrent, 0.3–0.5 mm. long; blades 1–4.5 cm. (mostly 2–3 cm.) long, 2–5 mm. wide, subglabrous to sparingly papillose-pubescent, the hairs more numerous on the upper surface; panicle very contracted, 1–3 cm. long, the rachis and branches rather stout and angled, the lowermost branches not more than 1 cm. long; spikelets 1.6–2 mm. long, hispid or tuberculate-hispid, the first glume often nearly glabrous, the hairs confined to the second glume and sterile lemma.

BRITISH NEW GUINEA: Central Division: Koitaki, *Carr 11964* (US).

India to the Philippines, New Guinea and Samoa. Introduced into the West Indies.

3. **Cyrtococcum patens** (L.) A. Camus, Bull. Mus. Hist. Nat. (Paris) 27: 118. 1921; Ohwi, Bot. Mag. (Tokyo) 56: 6. 1942.

Panicum patens L., Sp. Pl. 58. 1753; K. Schum. and Lauterb., Fl. Deutsch. Schutzgeb. Südsee 178. 1901. Type from India.

Panicum radicans Retz., Obs. Bot. 4: 18. 1786. Type from China.

Panicum accrescens Trin., Sp. Gram. Ic. 1: *pl. 88*. 1827. Type from India.

Panicum carinatum Presl, Rel. Haenk. 1: 309. 1830; Guppy, Solomon Islands 304. 1887; K. Schum., Notizbl. Bot. Gart. Berlin 1: 206. 1896; Scribn., Missouri Bot. Gard. Rep. 10: 46. *pl. 17*. 1899. Type from the Philippines.

Paspalum carinatum (Presl) K. Schum. and Hollr., Fl. Kais. Wilhelmsland 21. 1889. Error for *Panicum carinatum* Presl.

Culms glabrous, slender, creeping, the ascending flowering branches as much as 60 cm. tall; sheaths mostly shorter than the internodes, papillose-pilose, the margins ciliate; ligule membranous, about 1 mm. long; blades subglabrous to more or less densely appressed-pubescent, often papillose-pilose toward the base, 5–15 cm. long, 6–15 mm. wide; panicle diffuse, as much as 30 cm. long, the capillary branches and branchlets smooth, spikelet-bearing toward their ends; spikelets about 1.5 mm. long, purplish, glabrous or minutely hispidulous, especially toward the tips of the glumes and sterile lemma; fertile lemma indurate, minutely longitudinally striate.

BRITISH NEW GUINEA: Central Division: Kubuna, alt. 100 m., *Brass 5617* (A, US) (plentiful in native gardens); Western Division: Daru Island, *Brass 6295* (A, US) (massed under shade of mango trees in native gardens); Middle Fly River, Lake Daviumbu, *Brass 7773, 7889* (A, US) (common weed in rain-forest clearings and in native villages); Northern Division: About 9 miles northwest of Oro Bay, *Reeder 824* (A, US) (in sandy soil of recent borrow pit); Goodenough Island: Two miles west of Haiwali Village, *Burcham 135* (US) (scanty soil among boulders in dense secondary growth near native village). NORTHEAST NEW GUINEA: Morobe District: Wantoat, *Clemens 11272* (US); *Weinland 276* (US). SOLOMON ISLANDS: Bougainville: *Kajewski 2253* (GH).

Indo-Malayan region to New Guinea and Polynesia.

3a. **Cyrtococcum patens** (L.) A. Camus var. **Warburgii** (Mez) comb. nov.

Panicum Warburgii Mez in Perkins, Fragm. Fl. Philip. 143. 1904. Type from the Philippines.

Panicum patens var. *parvulum* Warb. ex Mez, *loc. cit.* (as synonym of *P. Warburgii*).

Panicum patens L. var. *Warburgii* (Mez) Hack. ex Merr., Philip. Jour. Sci. 1: Suppl. 362. 1906 (as synonym of *P. Warburgii*).

Cyrtococcum Warburgii (Mez) Stapf, Hook. Ic. 31: sub *pl. 3096*. 1922.

Much smaller than the species; blades 1–5 cm. long, 2–4 mm. wide; panicle 5–8 cm. long, often reduced to only a few branches; spikelets borne on terete capillary branches seemingly identical with those of *C. patens*. Perhaps it represents only a depauperate form of that species.

BRITISH NEW GUINEA: Central Division: Lolorua, *Carr 11503* (NY) (swampy land under *Hevea*).

Philippines and New Guinea.

9. **Cleistochloa** C. E. Hubb.

Cleistochloa C. E. Hubb., Hook. Ic. 33: *pl. 3209*. 1933.

Spikelets dorsally compressed, dimorphic, the back of the fertile lemma turned away from the axis; cleistogamous spikelets solitary, abundant in the axils of the sheaths, freely disarticulating from the pedicels when mature; chasmogamous spikelets borne in short, terminal, spikelike racemes; glumes unequal, the first small, hyaline, nerveless, the second nearly as long as the spikelet; sterile lemma about equaling the second glume and similar to it in the chasmogamous spikelets — in the cleistogamous spikelets much thickened and indurate on the back and with two prominent grooves, beaked, and as long as the fertile lemma which it nearly encloses; fertile lemma punctate-rugose in both kinds of spikelets, the margins thin, not inrolled. Perennial branching grasses with slender rigid culms, rigid blades, ciliate ligules, and short spikelike racemes.

Cleistogamous spikelets seem to be produced continually throughout the year while the terminal racemes appear only at certain seasons.

TYPE SPECIES: *Cleistochloa subjuncea* (Domin) C. E. Hubb. (*Panicum subjunceum* Domin, non Ekman).

1. **Cleistochloa Sclerachne** (F. M. Bailey) C. E. Hubb., Hook. Ic. 33: sub *pl. 3209*. 1933.

Chionachne Sclerachne F. M. Bailey, Queensl. Dept. Agr. Bull. 7 (Bot. Bull. 2): 21. 1891. Type from Australia.

Polytoca Sclerachne (F. M. Bailey) F. M. Bailey, Queensl. Fl. 6: 1849. 1902.

Perennial; culms tufted from a woody base, glabrous, rigid, branching, some of them weak and straggling, as much as 130 cm. long; sheaths much shorter than the internodes, glabrous or sparsely papillose-pilose, the hairs when present as much as 5 mm. long, ciliate on the margins, the hairs often much longer toward the ligule; ligule a row of stiff hairs about 0.5 mm. long; blades freely disarticulating from the sheaths, rigid, flat to subinvolute, 3–7 cm. long, 1.5–3.5 mm. wide, glabrous or minutely pubescent, often with a few long hairs near the base, the margins scabrous; chasmogamous spikelets about 5 mm. long, glabrous except for short cilia at the tip of the second glume and lemmas; first glume bifid, nerveless, about 0.5 mm. long; second glume slightly shorter than the spikelet, 5-nerved, the apex obtuse; sterile lemma as long as the spikelet, 7–9-nerved, obtuse; fertile lemma punctate-rugose; cleistogamous spikelets 5.5–8 mm. long, glabrous and shining except for a few minute cilia at the tip; first glume nerveless, reduced to an obscure rim at the base of the spikelet; second glume about one-sixth shorter than the spikelet, obtuse to apiculate, 5–7-nerved; sterile lemma indurate, prominently beaked, nearly as long as the fertile lemma which it almost completely encloses; fertile lemma punctate-rugose, chartaceous-indurate, the long beak usually extending slightly as a hard point through the overlapping margins of the tip of the sterile lemma.

BRITISH NEW GUINEA: Western Division: Tarara, Wassi Kussa River, *Brass 8735* (A, US) (on raw clay soils).

Australia and New Guinea.

Closely related to *Cleistochloa subjuncea* (Domin) C. E. Hubb., but that species has truncate or emarginate second glume and sterile lemma in the chasmogamous spikelets and trunctate second glume in the cleistogamous spikelets. The cited specimen has only one chasmogamous spikelet which is glabrous rather than pubescent. In all other respects it agrees well with the emended description by Hubbard (loc. cit.) and compares favorably with a topotype in the U. S. National Herbarium. This specimen was referred to *C. subjuncea* by Chase (17, p. 312).

10. **Alloteropsis** Presl

Alloteropsis Presl, Rel. Haenk. 1: 343. *pl. 47*. 1830.

Coridochloa Nees, Edinb. New Phil. Jour. 15: 381. 1833.

Spikelets ovate-lanceolate, dorsally compressed, in pairs or clusters along the narrow trigonous rachis, the back of the fertile lemma turned toward it; glumes membranous, unequal, the first smaller, 3-nerved and often with a short awn or mucro, the second equaling the spikelet, 5-nerved, the outer nerves submarginal and densely ciliate; sterile lemma similar but usually of a firmer texture than the second glume, the margins glabrous or

with a few weak hairs, enclosing a short cleft palea and sometimes a staminate flower; fertile lemma chartaceous-indurate, smooth, with an awn as much as 3 mm. long, the margins thin and delicately ciliolate, the palea of a similar texture. Perennials (ours) with densely tufted culms and few to several subdigitate racemes.

TYPE SPECIES: *Alloteropsis semialata* (R. Br.) Hitchc. (*Panicum semialatum* R. Br.).

1. **Alloteropsis semialata** (R. Br.) Hitchc., Contr. U. S. Nat. Herb. 12: 210. 1909; Brittonia 2: 124. 1936.

Panicum semialatum R. Br., Prodr. Fl. Nov. Holl. 1: 192. 1810; F. Muell., Pap. Pl. 2: 19. 1885; Maiden, Grass. N. S. Wales 33. *pl.* 1898. Type from Australia.

Urochloa semialata (R. Br.) Kunth, Rev. Gram. 1: 31. 1829.

Alloteropsis distachya Presl, Rel. Haenk. 1: 344. *pl. 47.* 1830; Scribn., Missouri Bot. Gard. Rep. 10: 37. *pl. 23.* 1899. Type probably from Luzon, Philippines, but the locality incorrectly cited by Presl as California.[11]

Coridochloa semialata (R. Br.) Nees, Jour. Bot. Kew Misc. 2: 97. 1850.

Axonopus semialatus (R. Br.) Hook. f., Fl. Brit. Ind. 7: 64. 1896.

Perennial; culms densely caespitose, slender, erect, 30–100 cm. tall, glabrous, or more or less pubescent below the inflorescence, the nodes somewhat bearded; basal sheaths velvety-villous, forming a compact tufted base to the culm, upper sheaths glabrous to more or less pilose; ligule membranous, erose, about 0.3 mm. long; blades linear, 10–30 cm. long, 3–7 mm. wide, flat, involute in drying, glabrous to papillose-pilose, especially below; racemes 2–4, 3–15 cm. long, subdigitate, the rachis slender, angled, villous; spikelets ovate-lanceolate, 5–6 mm. long; first glume about half as long as the spikelet, 3-nerved, mucronate or awn-tipped; second glume pointed or awn-tipped, densely ciliate, the hairs appressed at first, finally widely spreading; sterile lemma similar to the second glume but slightly more firm, awnless, often sparsely ciliolate on the margins, enclosing a short hyaline cleft palea and often a staminate flower; fertile lemma chartaceous-indurate, bearing an awn as much as 3 mm. long, the margins ciliolate.

BRITISH NEW GUINEA: Central Division: Kanosia, *Carr 11054, 11546* (NY) (on open savannah land); Port Moresby to Kalo, *MacGregor 37* (US); Northern Division: About 9 miles northwest of Oro Bay, *Reeder 802* (A, US) (in rich black soil of grassland); Western Division: Wuroi, Oriomo River, alt. 10–30 m., *Brass 5745* (US) (on savannah ridges); Daru Island, *Brass 6343* (A, US) (on hard-packed soil of roadways); Lake Daviumbu, Middle Fly River, *Brass 7924* (A, US) (occasional on savannah slopes); Tarara, Wassi Kussa River, *Brass 8409* (A, US) (common on ridges in savannah forests); Goodenough Island: Malauna Creek, *Burcham 131* (US) (occasional along creek bed and banks). NORTHEAST NEW GUINEA: Morobe District: Wau, *Clemens 10459bis* (US).

Tropical regions of the Eastern Hemisphere.

11. Hymenachne Beauv.

Hymenachne Beauv., Ess. Agrost. 48. *pl. 10, fig. 8.* 1812.

Spikelets acuminate, short-pediceled in dense spikelike or interrupted panicles; first glume acute to acuminate, 3–5-nerved, one-third to half as long as the spikelet, separated from the second glume by a distinct inter-

[11] See Hitchcock, Contr. U. S. Nat. Herb. 12: 210. 1909.

node; second glume and sterile lemma 5-nerved, acuminate, the lemma longer and often with an awn-like tip; fertile lemma pale, membranous, the margins not inrolled, the tip of the palea free. Coarse aquatic perennials with broad, firm, cordate-clasping blades and long contracted or spikelike panicles with densely flowered branches.

TYPE SPECIES: *Hymenachne amplexicaulis* (Rudge) Nees (*Panicum amplexicaule* Rudge).

1. **Hymenachne amplexicaulis** (Rudge) Nees, Agrost. Bras. 276. 1829; Pilger, Nat. Pflanzenfam. ed. 2. **14e:** 49. *fig. 26.* 1940; Chase, Jour. Arnold Arb. 20: 312. 1939.

   Panicum amplexicaule Rudge, Pl. Guiana 1: 21. *pl. 27.* 1805; Trin., Sp. Gram. Ic. 2: *pl. 205.* 1829. Type from British Guiana.

Coarse aquatic perennial; culms succulent, rather stout, usually 1–2 meters or more long, often decumbent below and rooting at the nodes; sheaths rather loose, often overlapping, glabrous or ciliate on the margins; ligule membranous, 1–2 mm. long; blades flat, rather firm, about 15–35 cm. long, 1.5–3 cm. wide, acuminate, gradually narrowed from the cordate-clasping base, the margins scabrous, more or less papillose-hispid-ciliate at the base; panicles 15–30 cm. long, spikelike, the lower branches often distant; spikelets 3.5–5 mm. long, acuminate, the second glume and sterile lemma scabrous on the nerves, the lemma often awn-pointed; fertile lemma thin-membranous, about 3 mm. long.

BRITISH NEW GUINEA: Western Division: Lake Daviumbu, Middle Fly River, *Brass 7613* (A, US) (sporadic in *Oryza* and *Leersia* stands of swamp margins). NETHERLANDS NEW GUINEA: Bruine River, alt. about 100 m., *Docters van Leeuwen 11149* (GH).

Tropical and subtropical regions of both hemispheres.

12. Digitaria Heist. ex Haller [12]

Digitaria Heist. ex Haller, Hist. Stirp. Helvet. 2: 244. 1768; Scop., Fl. Garn. ed. 2. 1: 52. 1772.

Syntherisma Walt., Fl. Carol. 76. 1788.

Spikelets lanceolate or elliptic, nearly plano-convex, in twos or threes, rarely solitary, subsessile or short-pediceled, alternate in two rows on one side of a 3-angled, winged or wingless rachis, the back of the fertile lemma turned toward it; glumes unequal, the first minute or wanting, the second as long as the spikelet or shorter; sterile lemma as long as the spikelet; fertile lemma cartilaginous, the margins hyaline, not inrolled. Annual or perennial, often weedy grasses with membranous or hyaline ligules and slender racemes digitate or approximate on a short axis.

TYPE SPECIES: *Digitaria sanguinalis* (L.) Scop. (*Panicum sanguinale* L.).

KEY TO THE SPECIES

1. Spikelets 5–6 mm. long; sterile lemma 11–13-nerved.....1. *D. longissima.*
1. Spikelets not more than 3.5 mm. long; sterile lemma 5–7-nerved.
   2. Spikelets 1.5 mm. long.
      3. Spikelets glabrous; plants tufted, less than 10 cm. tall.....9. *D. perpusilla.*

[12] For a discussion of the date and place of valid publication of this generic name see Hitchcock (Rhodora 29: 114–116. 1927). According to the International Rules (Art. 42) the correct citation is "Digitaria Heist. ex Haller," and not "Heist. ex Scop." as Hitchcock indicates.

3. Spikelets more or less pubescent; plants larger.
   4. Fertile lemma pale; plants creeping.....7. *D. longiflora.*
   4. Fertile lemma dark brown; plants erect, 40–60 cm. tall....8. *D. violascens.*
2. Spikelets 2.5 mm. or more long (only about 2 mm. in *D. Baileyi*).
   5. First glume wanting or minute; second glume about one-third as long as the spikelet or shorter.
      6. Racemes mostly 8–10, approximate, not digitate; first glume often wanting.. .....4. *D. pruriens.*
      6. Racemes 3–5, digitate or rarely 1 or 2 below; first glume a small deltoid scale .....5. *D. radicosa.*
   5. First glume small but distinct; second glume half as long as the spikelet or longer.
      7. One spikelet of the pair usually undeveloped; blades strict..3. *D. abortiva.*
      7. Both spikelets of the pair well developed; blades lax and spreading.
         8. Sheaths papillose-pilose; spikelets about 3 mm. long....2. *D. sanguinalis.*
         8. Sheaths glabrous; spikelets 2.5 mm. long or shorter.....6. *D. Baileyi.*

1. **Digitaria longissima** Mez, Repert. Sp. Nov. 18: 26. 1922. Type from New Ireland.

   Panicum heteranthum Nees & Mey. var. *pachyrachis* Hack., Philip. Jour. Sci. Bot. 3: 167. 1908. Type from the Philippines.

   Digitaria heterantha (Nees & Mey.) Merr. var. *pachyrachis* (Hack.) Merr., Enum. Philip. Fl. Pl. 54. 1925.

Perennial; culms glabrous, ascending and creeping, as much as 1 meter long; sheaths glabrous, somewhat keeled; ligule 2–3 mm. long, subtruncate, denticulate; blades flat, rather firm, 5–7 mm. wide, as much as 15 cm. long, both surfaces glabrous, scabrous on the margins; racemes 2–4, digitate, erect or somewhat spreading, 12–18 cm. long, the rachis glabrous, rather broad and thick; spikelets paired, 5–6 mm. long, one nearly sessile, the other on a pedicel about two-thirds the length of the spikelet or longer, the pedicel rather stout and somewhat hollowed out on the side next to the lower spikelet; first glume obsolete, obtuse to bifid; second glume half to two-thirds as long as the spikelet, 3-nerved, silky-pubescent between the nerves; sterile lemma 11–13-nerved, glabrous except for the silky-pubescent margins; fertile lemma pale.

NEW IRELAND: *Peekel 301* (US, TYPE fragment).
New Ireland; Peleliu to the Philippines.

Closely related to *Digitaria barbata* Willd., to which specimens have been referred, but differing in having somewhat larger nearly glabrous spikelets, in which the sterile lemma is 11–13-nerved rather than 7–9-nerved, usually a broader and thicker rachis, and leaves of a somewhat firmer texture. The two also differ in habit, *D. barbata* being very stoloniferous while *D. longissima* has decumbent and creeping culms but no true stolons.

Judging from the original description, *Digitaria Kanehirae* Ohwi (56, p. 543), described from Peleliu, seems referable to *D. longissima*. This latter species is known to occur in Peleliu, since a specimen in the U. S. National Herbarium (*Burcham 150*) was collected there in 1944.

2. **Digitaria sanguinalis** (L.) Scop., Fl. Carn. ed. 2. 1: 52. 1772.

   Panicum sanguinale L., Sp. Pl. 57. 1753; Trin., Sp. Gram. Ic. 1: *pl. 93, 94.* 1828. Habitat in America and Europe.

   Panicum adscendens H.B.K., Nov. Gen. et Sp. 1: 97. 1815. Habitat in tropical America.

Digitaria marginata Link, Enum. Pl. 1: 102. 1821. Type from Brazil.
Digitaria fimbriata Link, Hort. Berol. 1: 226. 1827. Type from Brazil.
Syntherisma sanguinalis (L.) Dulac., Fl. Haut. Pyr. 77. 1867.
Syntherisma fimbriata (Link) Nash, Bull. Torr. Bot. Club 25: 302. 1898.
Syntherisma marginata (Link) Nash, N. Amer. Fl. 17: 154. 1912.
Digitaria adscendens (H.B.K.) Henr., Blumea 1: 92. 1934.

Annual; culms weak and spreading, as much as 1 meter long, profusely branching below, glabrous; sheaths, at least the lower, papillose-pilose; ligule about 2 mm. long, erose; blades 3–8 mm. wide, 4–10 cm. long, glabrous or somewhat pubescent; racemes about 3–10, sometimes only 2, unequal in length, digitate or in two whorls; rachis winged, the wings slightly broader than the central rib, glabrous except for the scabrous margins; spikelets lanceolate-elliptic, about 3 mm. long; first glume small but distinct; second glume half as long as the spikelet or longer, narrow, 3-nerved, ciliate; sterile lemma strongly nerved, the lateral internerves appressed-pubescent, the hairs sometimes spreading at maturity; fertile lemma pale to tawny.

BRITISH NEW GUINEA: Central Division: Hisiu, *Carr 11439* (US, NY). NORTHEAST NEW GUINEA: Morobe District: Finschhafen, *Sawyer 83, 92* (A).

Common weed in cultivated and waste ground in tropical and temperate regions of both hemispheres.

Extremely variable in the amount of indument on the sterile lemma, some specimens appearing almost glabrous, while others have spikelets which are strongly fimbriate. Plants with this latter condition have been segregated and given varietal or even specific rank (*Digitaria fimbriata* Link). These segregates seem untenable, however, when it is seen that spikelets varying from essentially glabrous to strongly fimbriate may be found in the same inflorescence. *Carr 11439* is exceptional in having a pilose rachis.

Many of the early reports of this species from New Guinea may have been misidentifications for the closely related *Digitaria pruriens*.

3. **Digitaria abortiva** sp. nov. PLATE II.

Annua 25–50 cm. alta; culmis glabris, gracilibus, erectis vel adscendentibus; vaginis carinatis, papilloso-pilosis, quam internodiis longioribus; ligula membranacea, erosa, circiter 2 mm. longa; laminis strictis, lanceolato-linearibus, 2–8 cm. longis, 2–5 mm. latis, utrinque scabris et supra plus minusve papilloso-pilosis; pedunculo longe exserto; racemis 3–4 (rarius 7), digitatis vel approximatis, 4–7 cm. longis, floribus confertis, rhachi anguste alata, ad imam basin minute pubescente, marginibus scabris; spiculis circiter 2.5 mm. longis, plerumque solitariis, ad basin pedicelli abortivum ut videtur spiculum ferentibus; gluma prima scariosa, circiter 0.2 mm. longa, acuta; gluma secunda angusta, 3-nervia, quam spicula circiter tertia parte breviore, marginibus et inter nervos adpresse sericeo-pubescentibus, denique pilis plus minusve patentibus; lemmate sterili 5-nervia, nervis tribus prominentibus, ceteris obscuris, marginibus scariosis, plus minusve sericeo-pubescentibus, inter nervos sparsim pubescente; lemmate fertili straminea vel subfusca.

BRITISH NEW GUINEA: Central Division: Kanosia, *Carr 11108* (US, NY, TYPE), Feb. 5, 1935 (in open savannah land).

Related to *Digitaria sanguinalis*, but differing in the more erect habit, smaller strict leaves, long exserted inflorescence, and smaller spikelets which are usually borne singly rather than in pairs. Comparison may also be made with *D. Henryi* Rendle, but that species has a spreading habit, paired spikelets, glabrous sheaths, and a sterile lemma strongly 5–7-nerved. *Digitaria abortiva* has three strong nerves and usually two additional weak nerves, one on each side of the midnerve. *Digitaria Henryi* is not known from New Guinea. The specific epithet refers to the fact one spikelet of the pair usually fails to develop, being represented merely by a small vestige at the base of the pedicel of the solitary spikelet.

4. **Digitaria pruriens** (Fisch. ex Trin.) Buse in Miquel, Pl. Jungh. 379. 1854; Hitchc., Brittonia 2: 120. 1936.

Panicum pruriens Fisch. ex Trin., Gram. Pan. 77. 1826, Sp. Gram. Ic. 1: *pl. 92.* 1828; Hack., Bot. Jahrb. 6: 234. 1885. "Ex Inss. Sandw. et Marchion."

Panicum microbachne Presl, Rel. Haenk. 1: 298. 1830.[13]

Digitaria consanguinea Gaud. in Freyc., Voy. Uran. 410. 1830. Type from Hawaiian Islands.

Panicum sanguinale L. var. *microbachne* (Presl) Hack., Bot. Jahrb. 13: 259. 1890; K. Schum., Notizbl. Bot. Gart. Berlin 2: 92. 1898.

Syntherisma pruriens (Fisch. ex Trin.) J. C. Arthur, Torreya 19: 83. 1919.

Syntherisma microbachne (Presl) Hitchc., Mem. Bishop Mus. 8: 177. 1922.

Digitaria microbachne (Presl) Henr., Med. Rijks Herb. Leiden 61: 13. 1930.

Annual; culms ascending or decumbent, as much as 1 meter or more long, glabrous, branching and rooting from the lower nodes; sheaths mostly shorter than the internodes, glabrous to more or less densely papillose-pilose; ligule 2–4 mm. long; blades 5–15 (rarely 20) cm. long, 5–10 mm. wide, lax, glabrous or slightly pubescent below, scabrous and often undulate on the margins; racemes 8–10, aggregated, 8–14 cm. long, erect or somewhat spreading, the rachis angled and with scabrous margins; pedicels angled or narrowly winged, the longer 1.5–2 mm. long; spikelets more or less pubescent, lanceolate-elliptic, 2.5–3 mm. long; first glume wanting or very small, second glume about one-third as long as the spikelet or reduced to a minute nerveless scale; sterile lemma equaling or slightly exceeding the fertile one, 5–7-nerved; fertile lemma pale.

BRITISH NEW GUINEA: Northern Division: About 1 mile north of East Embi Lake, *Reeder 829* (A, US) (in abandoned native garden); Central Division: Mafulu, *Brass 5522* (A, US) (old garden and deforested land); Kanosia, *Carr 11031* (NY) (light shade); Hisiu, *Carr 11440* (NY) (open places); Western Division: Daru Island, *Brass 6305* (A, US) (common weed in gardens); Goodenough Island: Haiwali, *Burcham 120* (US) (grassy clearing in rainforest). NORTHEAST NEW GUINEA: *Weinland 75* (US); Morobe District: Near Kajabit Mission, alt. about 300 m., *Clemens 10630* (US). NEW BRITAIN: *Parkinson 66* (US).

China to the Philippines, Malaysia, New Guinea, and many Pacific Islands.

[13] In the original description no habitat is given, but a Haenke sheet in the herbarium of the National Museum, Prague (photograph and fragment at US) shows three specimens. Of these, the center one (a smaller specimen) is labelled "Mexico"; the one on the right bears the label "*Panicum microbachne*," while the one on the left has a label "Sorsogon." The two larger specimens seem to be the same and are taken as the type. The photograph and spikelets agree well with Presl's description. This would make the type locality Sorsogon, Luzon, Philippines.

Closely related to *Digitaria sanguinalis,* but differing in having an obsolete first glume and the second glume obsolete to one-third the length of the spikelet.

5. **Digitaria radicosa** (Presl) Miq., Fl. Ind. Bat. 3: 437. 1855.
Panicum radicosum Presl, Rel. Haenk. 1: 297. 1830. Type from the Philippines.

Annual; culms ascending, 40–80 cm. long, branching and rooting from the lower nodes; sheaths mostly shorter than the internodes, the lower often somewhat pubescent, the upper glabrous; ligule 1–2 mm. long, truncate, erose; blades 4–12 cm. long, 4–7 mm. wide, scaberulous on both surfaces, sometimes with a few hairs on the upper surface near the ligule, margins scabrous and often undulate, midnerve prominent, whitish; racemes usually about 3 (sometimes only 2 or as many as 5), digitate, mostly 7–15 cm. long, suberect to somewhat spreading, the rachis narrowly winged; spikelets paired, lanceolate, about 3 mm. long; first glume minute but evident; second glume about one-third the length of the spikelet, narrow, pubescent along the margins; sterile lemma about equaling the fertile one, appressed-pubescent along the margins, the soft white hairs often somewhat spreading; fertile lemma pale.

BRITISH NEW GUINEA: Northern Division: About 9 miles northwest of Oro Bay, *Reeder 817* (A, US) (in jungle clearing, forming mats); Western Division: Gaima, Lower Fly River, *Brass 8324* (A, US) (abundant as a weed in native gardens). NETHERLANDS NEW GUINEA: Balim River, alt. 1600 m., *Brass 11813* (A, US) (abundant as a weed in old gardens); Nassau Region, Explorat Biv., *Docters van Leeuwen 10498* (NY).

China to the Philippines and New Guinea.

Closely related to *Digitaria pruriens,* but a more delicate species with thinner, narrower blades, more slender culms, essentially glabrous foliage, and fewer, more lax racemes.

6. **Digitaria Baileyi** (Benth.) Hughes, Kew Bull. 1923: 308. 1923.
Panicum Baileyi Benth., Fl. Austral. 7: 471. 1878; F. M. Bailey, Compr. Cat. Queensl. Pl. *fig. 586.* 1909–13. Type from Australia.

Culms ascending or suberect, 50–100 cm. tall, slender, glabrous, but the lower internodes under a lens very minutely papillose-roughened, the nodes glabrous; sheaths scaberulous, shorter than the internodes, slightly keeled toward the summit, the hyaline margins extending into slight auricles 2–3 mm. long connected by the slightly shorter brownish ligule; blades flat, 7–14 cm. long, 3–5 mm. wide, scabrous on both surfaces, the pale midnerve rather prominent below; inflorescence long-exserted, of 6–9 slender ascending to spreading racemes on a slender angled axis about 8 cm. long, the lower two often rather distant; racemes 6–15 cm. long, the slender angled rachis puberulent in the axil, scabrous on the angles, interrupted below, the lowermost with appressed branchlets of 2–4 spikelets at the base; pedicels angled, scabrous, the longer about 2 mm. long; spikelets in pairs or often in threes, 2–2.5 mm. long; first glume hyaline, minute to nearly 0.5 mm. long; second glume about half to three-fourths as long as the spikelet, 3–5-nerved, fringed with silky hairs about 0.5 mm. long; sterile lemma 7-nerved, the outer internerves on each side bearing silky hairs similar to those of the second glume, these appressed to somewhat spreading; fertile lemma pale.

BRITISH NEW GUINEA: Central Division: Astrolabe Range, *Arnot 38* (US); Western Division: Tarara, Wassi Kussa River, *Brass 8695* (A, US) (common weed in deserted gardens).

Australia and New Guinea.

Brass 8695 was cited by Chase (17, p. 307) as *Digitaria quinhoensis* A. Camus (type fragment at US), an Indo-Chinese species of similar size and habit but bearing larger spikelets (3 mm. long), which are much less pubescent and have the first pair of lateral nerves on the sterile lemma close to the midrib, the second glume only about one-third as long as the spikelet, and a fertile lemma which is brown at maturity.

7. **Digitaria longiflora** (Retz.) Pers., Syn. Pl. 1: 85. 1805; Hitchc., U. S. Dept. Agric. Misc. Publ. 243: 171. *fig. 110*. 1936.

Paspalum longiflorum Retz., Obs. Bot. 4: 15. 1786. Type from India.

Panicum longiflorum (Retz.) Gmel., Syst. Nat. 2: 158. 1791.

Syntherisma longiflora (Retz.) Skeels, U. S. Dept. Agric. Bur. Pl. Indust. Bull. 261: 30. 1912.

Perennial; culms glabrous, creeping and producing stolons, forming dense mats, the upright flowering portion about 15 cm. or more tall; sheaths glabrous, shorter than the internodes; ligule membranous, more or less truncate, erose, about 1 mm. long; blades ovate-lanceolate, about 1.5–2 cm. long, 3 mm. wide, glabrous on both surfaces, the margins slightly coriaceous-thickened and scaberulous; racemes mostly in pairs, densely flowered, 3–4 cm. long, the slender rachis winged, glabrous, the wings broader than the midnerve; pedicels terete, glabrous, the longer not more than 1 mm.; spikelets minutely pubescent, about 1.5 mm. long and 0.6 mm. broad; first glume a delicate hyaline scale; second glume equaling the spikelet, 5-nerved; sterile lemma 7-nerved; fertile lemma pale.

BRITISH NEW GUINEA: Northern Division: About 9 miles northwest of Oro Bay, *Reeder 811* (A, US) (forming dense mats at the edge of a water hole).

Japan to India, Malaysia, and New Guinea. Introduced in tropical America.

8. **Digitaria violascens** Link, Hort. Berol. 1: 229. 1827; Hitchc., U. S. Dept. Agric. Misc. Publ. 243: 170. *fig. 109*. 1936; Chase, Jour. Arnold Arb. 24: 86. 1943. Type from Brazil.

Panicum violascens (Link) Kunth, Rev. Gram. 1: 33. 1829; Hack., Bot. Jahrb. 13: 259. 1890.

Paspalum chinensis Nees in Hook. & Arn., Bot. Beechey Voy. 231. 1836. Type from China.

Paspalum minutiflorum Steud., Syn. Pl. Glum. 1: 17. 1854 (non Desv. 1831); F. Muell., Vict. Nat. 1: 168. 1884. Type from China.

Digitaria chinensis (Nees) A. Camus, Not. Syst. Lecomte 4: 48. 1923 (non Hornem. 1819).

Syntherisma chinensis (Nees) Hitchc., Contr. U. S. Nat. Herb. 22: 468. 1922.

Annual; culms erect, tufted, slender, 50–70 cm. tall, glabrous; sheaths glabrous, mostly shorter than the internodes; ligule more or less truncate, slightly erose; blades glabrous, linear, 6–15 cm. long, 3–6 mm. wide; racemes 3–7, 6–12 cm. long, densely flowered, digitate or approximate on a short axis, the glabrous rachis about 0.5 mm. wide, broadly winged and scaberulous along the margins; pedicels terete to slightly flattened, minutely scabrous, as much as 2 mm. long; spikelets elliptic, about 1.5 mm. long and 0.7 mm. wide; first glume wanting; second glume slightly shorter than the spikelet, 3-nerved, pubescent between the nerves and along the

margin; sterile lemma about equaling the fertile one with 3 distinct nerves and one or two obscure pairs, and with indument like that of the second glume; fertile lemma dark brown at maturity.

BRITISH NEW GUINEA: Northern Division: About 9 miles northwest of Oro Bay, *Reeder 833* (A, US) (in old abandoned jeep trail). NORTHEAST NEW GUINEA: Morobe District: Above Molambing River, alt. about 2000 m., *Clemens 10359* (US). NETHERLANDS NEW GUINEA: Balim River, alt. 1600 m., *Brass 11822* (A, US) (sandy soil on deforested slopes).

Tropics of both hemispheres.

Readily distinguished from *D. longiflora* by its erect habit, longer leaves and racemes, and the dark brown fertile lemma.

9. **Digitaria perpusilla** Pilger, Bot. Jahrb. 69: 253. 1938.

Annual; culms slender, tufted, 4–7 cm. tall, glabrous; sheaths longer than the internodes, pilose, the hairs spreading, white, about 0.5 mm. long; ligule about 0.5 mm. long, more or less truncate, slightly erose; blades lanceolate, 6–8 mm. long, about 1 mm. wide, somewhat pilose with hairs similar to those of the sheath, the margins coriaceous-thickened and scaberulous; racemes in pairs, up to 20 mm. long, the slender rachis somewhat winged, scaberulous on the margins, glabrous, rather densely flowered, the pedicels up to 1.3 mm. long, mostly shorter; spikelets glabrous, elliptic, about 1.2 mm. long and 0.6 mm. wide; first glume wanting; second glume about two-thirds the length of the spikelet, 3-nerved, the margins hyaline; sterile lemma as long as the spikelet, 7-nerved, the three central nerves close together; fertile lemma dark brown at maturity, somewhat indurated except for the hyaline margins; palea similar to the lemma in texture; caryopsis oblong-ellipsoidal, white, the embryo small (about one-third the length of the caryopsis), brown.

NORTHEAST NEW GUINEA: Morobe District: Sarawaket, alt. about 3000 m., *Clemens 6120* (A, TYPE COLL., US).

Endemic. Known only from the type collection.

13. Eriochloa H. B. K.

Eriochloa H.B.K., Nov. Gen. et Sp. 1: 94. 1815.

Spikelets dorsally compressed, more or less pubescent, solitary or in pairs, short-pediceled or subsessile, in two rows on one side of a narrow, usually hairy rachis, the back of the fertile lemma turned away from it; rachilla below the second glume thickened into a ring- or bead-like callus; first glume wanting or reduced to a minute sheath surrounding the callus and adnate to it; second glume and sterile lemma subequal, membranous, acute or acuminate; fertile lemma indurate, minutely papillose-rugose, the margins slightly inrolled, the apex mucronate or short-awned. Annuals or perennials with terminal panicles consisting of few to many racemes racemose along the main axis.

TYPE SPECIES: *Eriochloa distachya* H.B.K.

1. **Eriochloa procera** (Retz.) C. E. Hubb., Kew Bull. 1930: 256. 1930.
Agrostis procera Retz., Obs. Bot. 4: 19. 1786. Type from India.
Milium ramosum Retz., Obs. Bot. 6: 22. 1791. Type from India.
Eriochloa ramosa (Retz.) Kuntze, Rev. Gen. 2: 775. 1891.

Annual or perennial; culms tufted or solitary, erect or ascending, 30–

100 cm. tall, glabrous or minutely puberulent, the indument more noticeable below the inflorescence; nodes glabrous to rather densely velvety-puberulent; sheaths glabrous or the lower slightly puberulent, keeled above; ligule a ring of whitish hairs 0.6–0.8 mm. long; blades glabrous, 4–20 cm. long, 2–8 mm. wide, flat or involute when dry; racemes few to many, simple or the lower ones branching, rather distant on a flattened puberulent axis about 0.5 mm. wide, scabrous on the angles; pedicels solitary or paired, the longer 1.5–2 mm. long, scabrous-hispidulous, the apex bearing long stiff hairs from one-fourth to as long as the spikelet; spikelets about 3 mm. long, sparsely appressed-pilose; first glume reduced to a minute sheath around the callus; second glume and sterile lemma subequal, 5-nerved, acuminate, the lemma usually slightly shorter, epaleate; fertile lemma pale, minutely rugose, about 2 mm. long, with an hispidulous mucro about 0.5 mm. long or less.

BRITISH NEW GUINEA: Central Division: Aroa River, *Carr 11435* (US, NY) (open sandy places).

Warmer regions of the Old World; introduced into tropical America.

A variable and wide ranging species. The cited specimens are somewhat unusual in being erect, densely tufted, and apparently perennial. The leaves are rather narrower than usual and are closely involute. In the character of the spikelets, however, I can find no significant differences.

14. Paspalum L.

Paspalum L., Syst. Nat. ed. 10. 2: 855. 1759.

Spikelets plano-convex, or sometimes unequally bi-convex or even concavo-convex, subsessile or short-pediceled, solitary or in pairs, in 2–4 rows on one side of a narrow or winged rachis, the back of the fertile lemma turned toward it; first glume typically wanting (sometimes slightly developed in *P. vaginatum*); second glume and sterile lemma usually similar, membranous (sterile lemma indurate in some specimens of *P. scrobiculatum*); fertile lemma and palea chartaceous-indurate, the margins of the lemma inrolled at maturity. Annual or perennial grasses of various habitat, widely distributed in the warmer regions of both hemispheres.

TYPE SPECIES: *Paspalum virgatum* L. [fide Pilger, Nat. Pflanzenfam. ed. 2. 14e: 59. 1940].

KEY TO THE SPECIES

1. Plants extensively creeping; long stolons or rhizomes present.
   2. Spikelets glabrous, 3.5–4 mm. long; blades involute.....1. *P. vaginatum.*
   2. Spikelets silky-ciliate on the margin, less than 2 mm. long; blades flat.....2. *P. conjugatum.*
1. Plants not creeping; culms sometimes more or less decumbent and rooting at base.
   3. Spikelets 1.5 mm. long or less; racemes lax, the rachis about 0.3 mm. wide; fertile lemma pale.....3. *P. paniculatum.*
   3. Spikelets 1.8 mm. or more long; racemes not lax, the rachis at least 1 mm. wide; fertile lemma brown at maturity.
      4. Glume and sterile lemma 3-nerved.
         5. Spikelets apiculate, in 4 rows (at least in the central part of the raceme).....6. *P. longifolium.*
         5. Spikelets obtuse, in two rows.....5. *P. orbiculare.*
      4. Glume and sterile lemma 5–7-nerved.....4. *P. scrobiculatum.*

1. **Paspalum vaginatum** Swartz, Prodr. Veg. Ind. Occ. 21. 1788; Trin., Sp. Gram. Ic. 1: *pl. 120.* 1828; Chase, Contr. U. S. Nat. Herb. 28: 41–45. *fig. 19.* 1929; Hitchc., Proc. Linn. Soc. N. S. Wales 54: 145. 1929. Type from Jamaica.
Paspalum littorale R. Br., Prodr. Fl. Nov. Holl. 1: 188. 1810. Type from Australia.
Paspalum distichum L. var. *littorale* (R. Br.) F. M. Bailey, Queensland Grasses 23. 1888; White, Proc. Roy. Soc. Queensl. 34: 15. 1923.

Perennials with long creeping rhizomes and also stoloniferous; flowering culms 8–60 cm. tall, glabrous; sheaths longer than the internodes, overlapping, often keeled, the margins hyaline, glabrous except for a few weak hairs near the ligule; ligule membranous, about 0.5 mm. long; blades 2.5–15 cm. long, 3–8 mm. wide at base, narrower than the summit of the sheath, more or less involute; racemes usually 2 (rarely 3–5), conjugate or closely approximate at first, often spreading or reflexed at maturity; rachis 1–2 mm. wide, 3-angled, often distinctly zig-zag, especially toward the end; spikelets solitary, imbricate, elliptic, glabrous, 3.5–4 mm. long; first glume wanting or rarely slightly developed; second glume and sterile lemma equal, thin, weakly 5-nerved, but the midnerve of the second glume often suppressed, the sterile lemma often transversely undulate; fertile lemma 2.5–3 mm. long, slightly concave-convex, and with a tuft of short stiff hairs at the apex, clasping the palea for only about two-thirds of its length.

British New Guinea: Gulf Division: Krema, *Brass 1229* (GH, US); Western Division: Daru Island, *Brass 6285* (A, US); coast between Oriomo and Fly Rivers, *Brass 6408* (A, US) (open beach).

Tropical and subtropical coasts of both hemispheres.

Often confused with *P. distichum* L., a closely related species which differs in having more turgid spikelets, an appressed-pubescent rather than glabrous second glume, and the fertile lemma clasping the palea for its entire length.

2. **Paspalum conjugatum** Bergius, Act. Helv. Phys. Math. 7: 129. *pl. 8.* 1762; Trin., Sp. Gram. Ic. 1: *pl. 102.* 1828; K. Schum. and Lauterb., Fl. Deutsch. Schutzgeb. Südsee 176. 1901; Chase, Contr. U. S. Nat. Herb. 28: 162–168. *fig. 105.* 1929; Hitchc., U. S. Dept. Agric. Misc. Publ. 243: 226. *fig. 177.* 1936; Pilger, Nat. Pflanzenfam. ed. 2. 14e: 61. *fig. 33.* 1940. Type from Surinam.

Perennial; extensively creeping with leafy, compressed, wiry stolons, as much as 2 meters long, the upright flowering branches 20–60 cm. tall, simple or sparingly branching, glabrous or the nodes often pubescent, those of the stolons usually conspicuously pilose; sheaths loose, compressed, the margins ciliate, at least on the upper half, often pubescent on the collar, otherwise glabrous; ligule membranous, about 0.5 mm. long and with a ring of white hairs back of it, these as much as 2 mm. long; blades flat, thin, 8–12 cm. long, 5–15 mm. wide, the margins scabrous or ciliate-hispid, usually glabrous below and sparsely pubescent to glabrous above; racemes in pairs, rarely a third below, widely divergent, 8–12 cm. long, the rachis flattened; spikelets solitary, 1.5–1.7 mm. long, ovate, light yellow, conspicuously silky-ciliate on the margins, otherwise glabrous; second glume and sterile lemma equal; fertile lemma pale, not strongly indurate.

British New Guinea: Central Division: Dieni, Ononge Road, alt. 500 m., *Brass 3935* (A, US) (common along roadside and covering rest-house clearing); Kanosia, *Carr 11025* (US); Northern Division: About 7 miles northwest of Oro Bay, *Reeder 799* (A, US) (in sandy soil of borrow pit, forming mats); West-

ern Division: Gaima, Lower Fly River, *Brass 8325* (A, US) (massed as a weed in native gardens). NORTHEAST NEW GUINEA: Morobe District: Finschhafen area, four miles south of Langemak Bay, *Sawyer 34, 108* (A). NETHERLANDS NEW GUINEA: Reese Region, Gelder River, alt. about 100 m., *Docters van Leeuwen 9252* (GH). SOLOMON ISLANDS: San Cristoval: *Brass 2817* (GH).

Widely distributed in the tropics and subtropics of both hemispheres.

3. **Paspalum paniculatum** L., Syst. Nat. ed. 10. 2: 855. 1759;[14] Trin., Sp. Gram. Ic. 2: *pl. 127*. 1829.

Perennial; culms caespitose, suberect or ascending, 50–100 cm. tall, glabrous or the nodes often more or less pubescent with stiff ascending hairs; sheaths usually longer than the internodes, keeled, papillose-hispid to papillose-pilose, the hairs as much as 5 mm. long; ligule about 0.5 mm. long, membranous, and bearing behind it a dense row of white hairs as much as 12 mm. long; blades flat, spreading, 10–40 cm. long, 10–25 mm. wide, from coarsely hispid on both surfaces and with a long tuft of white hairs at the base to scabrous or sometimes glabrous except at base and along the margin, the midnerve prominent beneath; panicle 10–20 cm. long, of numerous spreading to somewhat drooping racemes, the lowermost as much as 10 cm. long; spikelets in pairs, subhemispheric, 1.3–1.5 mm. long, on slender pedicels, crowded along the slender angled rachis; glume and sterile lemma equal, 5-nerved, the lateral pair contiguous, glume loosely pubescent with delicate hairs, the sterile lemma with similar hairs along the margin, sometimes throughout; fertile lemma pale.

BRITISH NEW GUINEA: Northern Division: About 8 miles northwest of Oro Bay, *Reeder 805* (A, US) (growing in sand at edge of coconut grove); Goodenough Island: Two miles west of Haiwali, *Burcham 134* (US) (scanty soil among boulders in dense secondary growth near native village).

Mexico and the West Indies to Argentina, West Africa, Society Islands, Australia, and New Guinea.

4. **Paspalum scrobiculatum** L., Mant. 1: 29. 1767; F. Muell., Pap. Pl. 2: 35. 1886. Type from India.

Paspalum cartilagineum Presl, Rel. Haenk. 1: 216. 1830; K. Schum. and Lauterb., Fl. Deutsch. Schutzgeb. Südsee 175. 1901. Type from the Philippines.

Paspalum Zollingeri Steud., Syn. Pl. Glum. 1: 28. 1854; K. Schum., Bot. Jahrb. 9: 195. 1887. Type from Java.

Culms solitary or tufted, 50–100 cm. tall, erect or ascending, sometimes somewhat decumbent and rooting from the lower nodes, often rather stout; sheaths glabrous, longer than the internodes, compressed-keeled, especially toward the summit; ligule membranous, 0.5–1 mm. long, with a row of tawny hairs back of it, or these sometimes wanting or obscure; blades glabrous, firm, flat or folded, 15–50 cm. long, 7–12 mm. wide, the margins scabrous, the upper surface more or less glaucous; racemes 2–5 (rarely up to 8), alternate on a slender, glabrous, angled axis; rachis 1.5–3 mm. wide, the margins minutely scabrous; spikelets solitary, imbricate, glabrous, orbicular to ovate, 2–3 mm. long; second glume membranous, 5-nerved; sterile lemma 5–7-nerved, membranous or sometimes indurate (*P. cartilagineum* Presl); fertile lemma dark brown at maturity.

BRITISH NEW GUINEA: Northern Division: About 9 miles northwest of Oro Bay, *Reeder 818* (US) (open, low swampy ground); about 3 miles south of

[14] No locality is cited, but in Sp. Pl. ed. 2. 81. 1762, Linnaeus gives the habitat as Jamaica. See Chase, Contr. U. S. Nat. Herb. 28: 122. 1929.

Dobodura, near Sambogo River, *Reeder 826* (US); Gulf Division: Maclatchi Point, *Brass 1183* (GH, US) (in clumps on the beach); Western Division: Daru Island, *Brass 6297* (A, US) (common on wet pathways and in garden clearings); Palmer River, 1 mile above junction with Black River, *Brass 6948* (A, US) (sand binder on gravel banks); Lake Daviumbu, Middle Fly River, *Brass 7529* (A, US) (restricted to swamp margins); Gaima, Lower Fly River, *Brass 8302* (A, US) (associated with sedges on open sandy foreshores); Goodenough Island: Malauna Creek, *Burcham 129* (US) (scanty moist soil along creek bed and banks). NORTHEAST NEW GUINEA: Morobe District: 4 miles south of Langemak Bay, near Finschhafen, *Sawyer 94* (A). NETHERLANDS NEW GUINEA: Balim River, alt. 1600 m., *Brass 11817* (A, US) (rare on deforested slopes); Bernhard Camp, Idenburg River, alt. 50 m., *Brass 13784* (A, US) (on logs floating in lagoons and quiet backwater).

Tropics and subtropics of the Old World.

A variable species, but readily distinguished by its robust habit and 7-nerved sterile lemma. *Paspalum cartilagineum* is here considered as a synonym, since there is no reliable character by which it may be separated. The indurate sterile lemma might seem to be specific, but this breaks down when it is found that on the same plant both indurate and membranous sterile lemmas may be present. Some spikelets show half the sterile lemma indurate and the other half membranous.

4a. **Paspalum scrobiculatum** L. var. **bispicatum** Hack. ex. Merr., Fl. Manila 86. 1912; Kneuck., Allg. Bot. Zeitschr. 20: 146. 1914. Type from the Philippines.

Distinguished from the species by its slender culms 30–50 cm. tall and its 2 (rarely 3) racemes 3–5 cm. long, usually not more than 1 cm. distant. The inflorescence is typically long exserted on a slender peduncle and the spikelets are orbicular to elliptic, about 2 mm. long.

BRITISH NEW GUINEA: Northern Division: About 9 miles northwest of Oro Bay, *Reeder 815* (A, US) (rather common in wet areas, forming rosette-like clumps); Goodenough Island: Haiwali, *Burcham 122* (US) (grassy clearing in rain-forest; well drained sandy loam).

India to China, the Philippines, and New Guinea.

5. **Paspalum orbiculare** G. Forster, Fl. Ins. Austr. Prodr. 7. 1786; Hack., Bot. Jahrb. 13: 258. 1890; Hitchc., Mem. Bishop Mus. 8(3): 178. *fig. 68*. 1922. Type from the Society Islands.

Paspalum scrobiculatum L. *β orbiculare* (G. Forster) Hack., Bot. Jahrb. 6: 233. 1885.

Culms tufted, erect, glabrous, 40–80 cm. tall; sheaths glabrous, longer than the internodes, compressed-keeled especially toward the summit; ligule membranous, about 0.75 mm. long; blades elongate, flat or sometimes folded, 5–10 mm. wide, the upper surface somewhat glaucous and sometimes with a few long hairs near the ligule, the margins minutely scabrous; inflorescence long-exserted, consisting of 3–5 (rarely to 7) racemes, 3–6 cm. long, alternate and 1–2 cm. distant on a slender axis; rachis 1.5–3 mm. wide, scabrous on the margins; spikelets glabrous, oval to nearly circular with obtuse apex, about 2 mm. long, usually solitary (occasionally paired), imbricate, in 2 rows (rarely 3 or 4 rows) on the rachis; glume and sterile lemma equal, thin, 3-nerved; fertile lemma brown at maturity.

BRITISH NEW GUINEA: Goodenough Island: Malauna Creek, *Burcham 130* (US) (occasional in moist spots along creek bed and banks). NORTHEAST NEW GUINEA: Morobe District: Four miles south of Langemak Bay (near

Finschhafen), *Sawyer 93* (A); Wantoat, alt. about 1000 m., *Clemens 11047* (US). SOLOMON ISLANDS: San Cristoval: Waimaura, *Brass 2841* (GH).

Tropics and subtropics of the Old World.

Readily distinguished from *Paspalum scrobiculatum* by its 3-nerved glume and sterile lemma and its usually more numerous racemes, which are distant on the axis. The species may also be compared with *P. longifolium*, but that species has apiculate spikelets which are borne in pairs and are in four rows, at least in the central part of the raceme. The racemes are usually much more numerous and the rachis is broader.

6. **Paspalum longifolium** Roxb., Hort. Beng. 7. 1814, nomen, Fl. Ind. 1: 283. 1820, descr.; Trin., Sp. Gram. Ic. 2: *pl. 138*. 1829; F. Muell., Pap. Pl. 1: 74. 1876. Type from India.

Paspalum flexuosum Klein ex Presl, Rel. Haenk. 1: 215. 1830. Type from the Philippines.

Paspalum cognatum Steud., Syn. Pl. Glum. 1: 28. 1854. Type from Java.

Paspalum scrobiculatum L. var. *philippinensis* Merr., Philip. Jour. Sci. 1: Suppl. 345. 1906. Type from the Philippines.

Paspalum longifolium Roxb. var. *trichocoleum* Hack., Philip. Jour. Sci. Bot. 3: 167. 1908; Hitchc., Brittonia 2: 121. 1936. Type from the Philippines.

Paspalum scrobiculatum L. var. *longifolium* (Roxb.) Domin, Bibl. Bot. 85: 288. 1915.

Perennial; culms solitary or tufted, rather stout, 80–130 cm. tall; sheaths longer than the internodes, compressed-keeled, glabrous to more or less densely papillose-pilose, especially on the margins; ligule membranous, about 2 mm. long, often with a row of tawny hairs behind it; blades glabrous, firm, flat or folded, as much as 60 cm. long, about 6–9 mm. wide, the margins scabrous; racemes 4–12, about 5–8 cm. long, alternate and rather distant along the slender axis, this glabrous or with a few long hairs in the axils of the racemes; rachis 2–4 mm. wide (usually about 3 mm.), the margins scabrous; spikelets apiculate, paired, 4-rowed, at least in the central part of the raceme, broadly obovate, about 2–2.5 mm. long; glume and sterile lemma equal, 3-nerved, minutely crisp-puberulent to glabrous; fertile lemma brown at maturity.

BRITISH NEW GUINEA: Central Division: Hula, *Brass 521* (GH, US) (damp hollows in coast sandhills); Western Division: Dagwa, Oriomo River, alt. 40 m., *Brass 5922* (A, US) (plentiful in pond shallows); Daru Island, *Brass 6341* (A, US) (plentifully scattered through grass swamps in savannah forest). NORTHEAST NEW GUINEA: Morobe District: Near Kajabit Mission, *Clemens 10706* (A, US).

Tropical Asia, the Philippines, to New Guinea.

Apparently closely related to *Paspalum orbiculare*, with which it seems to intergrade. In general it is distinguishable by the more numerous racemes with 4-rowed, apiculate spikelets, and longer leaves. Most specimens of *P. longifolium* have pubescent spikelets, but all gradations may be found from those densely crisp-puberulent, through those only sparsely so, to specimens which are completely glabrous. Probably the most reliable character is the apiculate spikelet.

15. Setaria Beauv.

Setaria Beauv., Ess. Agrost. 51. *pl. 13, fig. 3*. 1812. nom. conserv. (non Archarius 1789, nec Michx. 1803).

Chaetochloa Scribn., U. S. Dept. Agric. Div. Agrost. Bull. 4: 38. 1897.

Spikelets dorsally compressed, elliptic or lanceolate, solitary or clustered, some or all subtended by one to several bristles (sterile branches), articulate on short discoid-tipped pedicels and falling free from the bristles; first glume broad, usually less than half the length of the spikelet, 3–5-nerved; second glume and sterile lemma equal or the former shorter, 5–7-nerved; fertile lemma indurate, smooth or prominently transversely rugose, the margins inrolled. Annuals or perennials with narrow, usually spikelike or rarely open panicles.

TYPE SPECIES: *Setaria viridis* (L.) Beauv. (*Panicum viride* L.).

KEY TO THE SPECIES

1. Panicle open; bristles single, below only part of the spikelets; leaves broad, plicate.. .....1. *S. palmaefolia.*
1. Panicle densely cylindric or more or less lobed; bristles few to several, below all the spikelets; leaves not plicate.
   2. Bristles below each spikelet numerous, at least more than 5; spikelets solitary, or sometimes with a rudimentary second, on the panicle branches.
      3. First glume acuminate; second glume as long as the spikelet or one-fourth shorter.....5. *S. surgens.*
      3. First glume acute or obtuse; second glume not more than two-thirds as long as the spikelet.
         4. Spikelets 2–2.2 mm. long; second glume half as long as the spikelet; sterile lemma strongly nerved.....4. *S. pallide-fusca.*
         4. Spikelets 2.6–3 mm. long; second glume more than half as long as the spikelet; sterile lemma faintly nerved.....6. *S. montana.*
   2. Bristles below each spikelet 1–3; spikelets usually 3 or more (rarely single on depauperate plants) on the panicle branches.
      5. Fertile floret falling free from the glumes and sterile lemma.....3. *S. italica.*
      5. Fertile floret falling together with the glumes and sterile lemma..... .....2. *S. viridis.*

1. **Setaria palmaefolia** (Koenig) Stapf, Jour. Linn. Soc. Bot. **42**: 186. 1914; Hitchc., Brittonia 2: 124. 1936.

   Panicum palmaefolium Koenig, Naturf. 23: 208. 1788. Type from Siam.

   Panicum palmifolium Willd. ex Poir. in Lam., Encycl. Suppl. 4: 282. 1816. Based on *P. plicatum* Willd., Enum. Hort. Berol. 2: 1033. 1809 (non Lam. 1791). Type from India.

   Panicum nervosum Roxb., Hort. Beng. 8. 1814, nomen, Fl. Ind. 1: 314. 1820, descr. (non Lam. 1798). Type from Nepal.

   Panicum neurodes Schult., Mant. 2: 228. 1824. Based on *P. nervosum* Roxb.

   Panicum sulcatum sensu K. Schum., Notizbl. Bot. Gart. Berlin 2: 93. 1898.

   Chaetochloa palmifolia (Willd. ex Poir.) Hitchc. and Chase, Contr. U. S. Nat. Herb. 18: 348. 1917; Hitchc., Contr. U. S. Nat. Herb. **22**: 161–162. *fig. 38.* 1920.

Perennial; culms erect, caespitose or with short rhizomes, 60–200 cm. tall; sheaths usually overlapping, rather loose, keeled, papillose-hispid or glabrous; ligule a dense ring of hairs 1.5–2 mm. long; blades scabrous, often pubescent below, as much as 40 cm. long and 6.5 cm. wide, strongly plicate, acuminate, narrowed to a petiole-like base; panicle loose and open, as much as 40 cm. long; the branches ascending or spreading, the lower somewhat distant, as much as 15 cm. long, the spikelets crowded on short branchlets appressed along the main branches, the bristles 5–15 mm. long, sometimes short and inconspicuous; spikelets 3–4 mm. long, lanceolate, acute, the margins of the glumes and sterile lemma more or less hyaline; first glume 3-nerved, ovate, acute or obtuse, one-third to half

the length of the spikelet; second glume 5-nerved, half to nearly as long as the spikelet, the apex acute; sterile lemma equaling or slightly exceeding the fertile, 5-nerved, acuminate, and with a short incurved point, enclosing a hyaline palea; fertile lemma faintly transversely rugose.

BRITISH NEW GUINEA: Central Division: Vanapa Valley, Urunu, alt. 1900 m., *Brass 4792* (GH, US) (common on damp stream banks on deforested land); Kanosia, *Carr 11355* (NY) (banks of river); Goodenough Island: Malauna Creek, about 1 mile west of Haiwali, *Burcham 133* (US). NORTHEAST NEW GUINEA: Morobe District: Dreger Harbor, near Finschhafen, *Reeder 885* (A, US) (along roadside); Sepik River, *Herre 313* (NY). NETHERLANDS NEW GUINEA: Bele River, 18 km. northeast of Lake Habbema, alt. 2200 m., *Brass 11471* (A, US) (occasionally associated with *Imperata* on formerly cultivated slopes); 4 km. southwest of Bernhard Camp, Idenburg River, alt. 850 m., *Brass 13263* (A, US) (rain-forest; common in open seral growths on river flood plain); Nassau Region, Explorat Biv., alt. about 1200 m., *Docters van Leeuwen 10814* (GH). SOLOMON ISLANDS: Bougainville: *Kajewski 1779* (GH).

2. **Setaria viridis** (L.) Beauv., Ess. Agrost. 51, 171, 178. *pl. 13, fig. 3.* 1812; Hack., Denkschr. Akad. Wiss. Math.-Naturw. (Wien) 89: 495. 1913.

Panicum viride L., Syst. Nat. ed. 10. 2: 870. 1759; Trin., Sp. Gram. Ic. 2: *pl. 203.* 1829. Type from Europe.[15]

Chaetochloa viridis (L.) Scribn., U. S. Dept. Agric. Div. Agrost. Bull. 4: 39. 1897.

Annual; culms tufted or solitary, erect or geniculate at base, 30–60 (10–100) cm. tall; sheaths rather loose, glabrous or papillose-hispid, ciliate on the margins and sometimes slightly ciliate on the collar; ligule short, densely ciliate; blades flat, 5–30 cm. long, 2–18 mm. wide, scabrous, especially above; panicle densely cylindric, erect or nodding, 5–10 (2–20) cm. long, the axis and branches pubescent; branches variable in length, bearing 3–6 spikelets (sometimes very short and reduced to 2 or 3 spikelets, or in giant specimens the branches 1 cm. or more long and very densely flowered); bristles 1–3 below each spikelet, mostly 4–12 mm. long, green or yellowish, or sometimes purple; spikelets 2–2.5 mm. long, 0.8–1 mm. wide, elliptical, usually obtuse; first glume 3-nerved, ovate, about one-third as long as the spikelet; second glume 5-nerved, equaling the spikelet or slightly shorter; sterile lemma 5-nerved, enclosing a small narrow palea; sterile lemma oblong, obtuse, obscurely rugose.

A cosmopolitan weedy species.

Although no specimens from New Guinea have been seen, this species is included since it was reported from New Britain by Hackel (25, p. 495) and is to be expected from New Guinea.

3. **Setaria italica** (L.) Beauv., Ess. Agrost. 51, 170, 178. 1812.

Panicum italicum L., Sp. Pl. 56. 1753; Trin., Sp. Gram. Ic. 2: *pl. 198.* 1829. Type from India.

Pennisetum italicum (L.) R. Br., Prodr. Fl. Nov. Holl. 1: 195. 1810.

Chaetochloa italica (L.) Scribn., U. S. Dept. Agric. Div. Agrost. Bull. 4: 39. 1897.

A cultivated form of *Setaria viridis;* culms usually stout, 30–150 cm. tall; blades as much as 45 cm. long and 2.5 cm. wide; panicles 10–30 cm. long, usually strongly lobate and drooping, sometimes as much as 3 cm. thick; bristles from scarcely as long as the spikelets to 3 or 4 times as long; spikelets 2–3 mm. long, the fertile floret smooth or nearly so, tawny to red, brown, or black at maturity, falling away from the glumes and sterile

[15] See Hitchcock, Contr. U. S. Nat. Herb. 22: 187. 1920.

lemma. The plants often propagate themselves in fields and waste places and then tend to revert to a more primitive form. Such plants are often difficult to distinguish from *S. viridis*, since the disarticulation of the "fruit" is often evident only at maturity, and even then is often not well marked in the uncultivated plants.

NETHERLANDS NEW GUINEA: Biak Island: Bosnek Bay, *M. E. Britton 22* (A).

Widely cultivated for its grains in many parts of the world; also escaped and appearing more or less as a waif in waste places.

F. T. Hubbard (Am. Jour. Bot. 2: 187. 1915) proposes three subspecies based on the color of the mature "fruit." The cited specimen apparently belongs to subspecies *stramineofructa* F. T. Hubb.

4. **Setaria pallide-fusca** (Schum.) Stapf and C. E. Hubb., Kew Bull. 1930: 259. (July) 1930, in Prain, Fl. Trop. Afr. 9: 815. (Aug.) 1930; C. E. Hubb. and Vaughan, Grass. Maurit. and Rodriguez 68. *fig. 11a*. 1940.

Panicum pallide-fuscum Schum., Beskr. Guin. Pl. 78. 1827. Type from West Africa.

Annual; culms more or less compressed, erect or ascending (sometimes sprawling), 30–100 (rarely to 150) cm. tall, branching below, often more or less decumbent and rooting from the lower nodes, more or less pubescent just below the panicle, otherwise glabrous; nodes glabrous, dark brown; sheaths glabrous, rather loose, compressed-keeled, the margins scarious; ligule a ciliate membrane about 1 mm. long; blades flat or folded (sometimes involute), 10–20 (rarely to 40) cm. long, 3–8 mm. wide, glabrous or more or less pilose above near the ligule; panicle long-exserted, dense, spikelike, evenly cylindric, 5–8 (3–15) cm. long, the rachis and branchlets densely pubescent; bristles numerous, 2–3 times the length of the spikelets; spikelets elliptical, 2–2.2 mm. long, about 1 mm. wide; first glume 3-nerved, about 0.8 mm. long, obtuse to acute; second glume 5-nerved, about half as long as the spikelet, obtuse; sterile lemma prominently 5-nerved, enclosing a well-developed palea and rarely a staminate flower; fertile lemma 2 mm. or less long, transversely rugose, rounded or slightly angled on the back, the apex acute, often very slightly mucronate.

BRITISH NEW GUINEA: Central Division: Mafulu, alt. 1250 m., *Brass 5482* (GH, US) (roadsides and sometimes on artificial grassland); Western Division: Wuroi, Oriomo River, alt. 10–30 m., *Brass 5740* (GH, US); Daru Island, *Brass 6270* (A, US) (plentiful on damper soils of savannah forests); Lake Daviumbu, Middle Fly River, *Brass 7883* (A, US) (restricted to patches of damper soil in savannahs); Northern Division: About 7 miles northwest of Oro Bay, *Reeder 804* (A, US) (occasional in wet areas); south of Cape Sudest, *Reeder 855* (A, US) (growing thickly along abandoned jeep trail); Goodenough Island: Haiwali, *Burcham 125* (US) (grassy clearing in rain-forest). NORTHEAST NEW GUINEA: Morobe District: Kajabit, Markham Valley, *Clemens 10540J* (US); Finschhafen, *Weinland 357* (US). NETHERLANDS NEW GUINEA: Balim River, alt. 1600 m., *Brass 11814* (US) (abundant in abandoned gardens); Waren, 60 miles south of Manokwari, alt. 10 m., *Kanehira and Hatusima 13371* (A) (in open grass-field).

Tropical and South Africa to tropical Asia, northern Australia, and Polynesia.

The cited specimens, though varying considerably in size and habit, are remarkably uniform in spikelet characters. Although the spikelets are slightly smaller than is usual for African specimens of this species, they

seem to differ in no other important respect. *Reeder 855* has a rather unusual habit, being weak-stemmed and sprawling, but in the character of the spikelets it seems identical with the others cited.

Specimens of this species have been referred to *Setaria geniculata* (Lam.) Beauv., a perennial species with larger and broader spikelets, in which the sterile lemma is 7- rather than 5-nerved.

5. **Setaria surgens** Stapf, Kew Bull. 1909: 265. 1909. Type from Netherlands New Guinea.

Perennial, but often flowering the first year and appearing annual; culms caespitose, often geniculate at base, 30–45 cm. tall, fluted above, pubescent below the panicle, otherwise glabrous or scabrous; nodes glabrous, dark brown to black; ligule a row of hairs 0.3–0.5 mm. long; blades flat, often involute in drying, 8–18 cm. long, 2–4 (rarely 5) mm. wide, scabrous on the margins, glabrous beneath, spreading-pilose above, the hairs weak, 2–3 mm. long; panicle spikelike, long-exserted, densely flowered, 3–5 cm. long, the rachis and branchlets pubescent; branches opposite or whorled, the bristles 6–8, about 8–12 mm. long; spikelets obovate-elliptic, solitary, 2.3–2.6 (rarely 3) mm. long; first glume 3-nerved, ovate, acuminate, half to two-thirds as long as the spikelet; second glume ovate, 5-nerved, as long as the spikelet or about one-fourth shorter; sterile lemma equaling the fertile one, 5-nerved, apiculate, enclosing a thin palea as long as the lemma and with two marginal nerves, these sometimes showing through the sterile lemma and making it appear 7-nerved; fertile lemma transversely rugose, broadly angled on the back.

BRITISH NEW GUINEA: Central Division: Hisiu, *Carr 11382* (NY) (open places near sea shore); Western Division: Near Dutch Boundary [Fly River], *MacGregor 11, 13* (US).

Australia and New Guinea.

Closely related to *Setaria apiculata* (Scribn. and Merr.) K. Schum., from Australia, but may be distinguished by its more densely flowered panicles and smaller, differently shaped spikelets, those of *S. apiculata* being broadly ovate and 3–3.5 mm. long, while those of *S. surgens* are obovate-elliptic and about 2.5 mm. long. Both of these species are characterized by an acuminate first glume and apiculate sterile and fertile lemmas.

Although Stapf's original description states that the first glume is "acute to apiculate," a specimen in the U. S. National Herbarium with an acuminate first glume was seen by C. E. Hubbard of Kew, who states that the spikelets agree perfectly with those of a specimen cited by Stapf with the original description of *S. surgens*. The type of *S. surgens* is not at Kew.

6. **Setaria montana** sp. nov. PLATE III.

Perennis? vel annua plerumque 40–80 cm. alta; culmis compressis, adscendentibus ad basin geniculatis, infra paniculam pubescentibus, ceterum glabris; nodis fuscis vel nigrescentibus, eis infra medium culmum saepe ramiferis; vaginis carinatis, glabris, quam internodiis brevioribus, plus minusve laxis, marginibus scariosis; ligula membranacea, ciliata, 0.5–0.8 mm. longa; laminis linearibus, saltem in sicco subinvolutis, 10–20 (raro ad 30) cm. longis, 2–5 mm. latis, subtus glabris, supra scabris et praecipue

prope basin plus minusve pilosis; panicula solitaria, dense spiciformi, 4–10 cm. longa, 5–8 mm. diametro, rhachi et ramis dense pubescentibus, ramis circiter 5 mm. longis; setis circiter 8–10, inaequalibus, usque ad 4–5 (raro ad 8) mm. longis, scabris, ferrugineis vel purpureis; spiculis ellipticis, 2.6–3 mm. longis, circiter 1.3 mm. latis, solitariis vel binatis quarum uno abortivo; gluma prima late ovata, acuta, 1.2–1.4 mm. longa, nervis 3–5, prominulis; gluma secunda late ovata, obtusa, quam spicula circiter tertia parte breviore, 5-nervia, nervis prominulis; lemmate sterili spicula aequante, nervis 3–5, obscuris; lemmate fertili ovata, mucronulata, transverse rugulosa, quam sterili paullo breviore.

BRITISH NEW GUINEA: Central Division: Urunu, Vanapa Valley, alt. 1900 m., *Brass 4788* (A, US) (conspicuous on open grasslands and fallow garden clearings). NORTHEAST NEW GUINEA: Morobe District: Ogeramnang, alt. about 1750 m., *Clemens 4498* (A). NETHERLANDS NEW GUINEA: 9 km. northeast of Lake Habbema, alt. 2800 m., *Brass 10746* (A, US) (plentiful on a native clearing in the forest; habit ascending and clump-forming; inflorescence reddish-brown); 18 km. northeast of Lake Habbema, alt. 2200 m., *Brass 11488* (A, TYPE, US) Nov. 1938 (very abundant on old garden lands; habit ascending); Balim River, alt. 1600 m., *Brass 11814* (A) [16] (abundant in abandoned gardens).

In some respects this species suggests the highly variable *Setaria geniculata* (Lam.) Beauv., but it differs in having a more slender panicle, longer and narrower spikelets with faintly 5-nerved rather than prominently 7-nerved sterile lemmas, usually much shorter bristles, and narrower subinvolute rather than flat blades. Comparison may also be made with *S. pallide-fusca*, but that species is definitely an annual with broader blades and smaller spikelets, in which the second glume is only half the length of the spikelets and the sterile lemma is prominently nerved. The cited specimens were all collected at elevations of 1600 meters or more.

16. Pseudoraphis Griff.

Pseudoraphis Griff., Not. ad Pl. Asiat. 3: 29. 1851; Pilger, Notizbl. Bot. Gart. Berlin 10: 209. 1928.

Spikelets lanceolate, attenuate, dorsally compressed, 2-flowered, the lower staminate, the upper pistillate, short-pediceled along the slender simple branches of the panicle, the back of the fertile lemma turned toward it; the branches produced beyond the spikelets into a slender bristle and finally disarticulating from the main axis; first glume nerveless, hyaline; second glume attentuate, 5–many-nerved; sterile lemma shorter than the second glume, acuminate, with a nerveless palea and a staminate flower; fertile floret pistillate, much shorter than the sterile lemma, membranous or very slightly indurated; caryopsis obovate-oblong, exposed beyond the lemma and palea at maturity. Aquatic or marsh perennials with simple contracted or narrow panicles, the branches stiffly ascending.

TYPE SPECIES: *Pseudoraphis Brunoniana* Griff.

1. **Pseudoraphis squarrosa** (L. f.) Chase, Jour. Arnold Arb. 20: 313. 1939.
   Andropogon squarrosus L. f., Suppl. Pl. 433. 1781. Type from Ceylon.
   Panicum asperum Koenig, Naturf. 23: 209. 1788 (non Lam. 1778). Type from East Indies.

[16] This collection consisted of a mixture, and the specimen under this number at the U. S. National Herbarium is *Setaria pallide-fusca*.

Chamaeraphis aspera (Koenig) Nees in Wall. Cat. No. 8679. 1849.
Pseudoraphis aspera (Koenig) Pilger, Notizbl. Bot. Gart. Berlin 10: 210. 1928; Blatter and McCann, Imp. Council Agric. Res. Sci. Monogr. 5: *pl. 109*. 1935.

Culms prostrate, rooting from the lower nodes, as much as 3–4 meters long, the ascending flowering portion 30–70 cm. tall, more or less branched, glabrous except for the more or less pubescent nodes; sheaths glabrous, rather loose, often prolonged into two sharp auricles, one on either side of the ligule and equal to it; ligule about 1 mm. long, membranous, erose; blades flat to involute, lanceolate-linear, 3–6 cm. long, 2–4 mm. wide, scabrous on the margins, the base often narrowed into a distinct petiole about 1 mm. long; panicle 6–14 cm. long, the slender scabrous branches several-flowered, stiffly ascending, the lowermost as much as 6 cm. long; spikelets lanceolate, acuminate, 5–7 mm. long, solitary, on pedicels about 0.5 mm. long; first glume truncate or rounded, hyaline, about 0.5 mm. long; second glume 5–7 mm. long, acuminate, scabrous to hispid on the nerves, the hairs sometimes tuberculate-based; sterile lemma somewhat shorter than the second glume, similar to it or lighter in color and with the nerves obscure, acuminate, glabrous or somewhat scabrous, enclosing a palea and a staminate flower; fertile lemma pistillate, 1.6–1.8 mm. long, membranous; mature caryopsis much exceeding the lemma and palea.

BRITISH NEW GUINEA: Western Division: Lake Daviumbu, Middle Fly River, *Brass 7600* (A, US) (rooting in shallows of swamps); Penzara, between Morehead and Wassi Kussa Rivers, *Brass 8470* (A, US) (in shallows of a permanent water hole).

India to the East Indies, Philippines, and New Guinea.

17. Pennisetum Rich.

Pennisetum Rich. in Pers., Syn. Pl. 1: 72. 1805.
Penicillaria Willd., Enum. Pl. Hort. Berol. 2: 1036. 1809.
Gymnothrix Beauv., Ess. Agrost. 59. *pl. 13, fig. 6*. 1812.

Spikelets lanceolate, sessile or short-pediceled, solitary or two to three together surrounded by an involucre of bristles (sterile branchlets), the fascicles subsessile or short-peduncled, usually crowded on a common axis and falling entire with the spikelets enclosed; glumes shorter than the spikelet, unequal, the first smaller, thin, usually nerveless, the second 1-nerved; sterile lemma few to several-nerved, acute or awn-pointed, enclosing a palea and often a staminate flower; fertile lemma equaling the sterile or shorter, smooth, chartaceous, rounded on the back, the margins thin, flat, enclosing a similar palea. Annuals or perennials with usually flat blades and dense spikelike panicles.

TYPE SPECIES: *Pennisetum typhoideum* Rich. = *P. spicatum* (L.) Koernicke (*Holcus spicatus* L.).

1. **Pennisetum macrostachyum** (Brongn.) Trin., Mém. Acad. St. Petersb. VI. Sci. Nat. 1: 177. 1834; F. Muell., Vict. Nat. 1: 168. 1884.
Gymnothrix macrostachys Brongn. in Duperry, Bot. Voy. Coquille 2 (2): 104. *pl. 11*. 1831. Type from the Moluccas.

Culms erect, glabrous, 2–3 meters tall, 1–2 cm. in diameter near the base, freely branching; sheaths usually overlapping, rather loose, somewhat keeled toward the summit; ligule membranous, 0.2 mm. long or less; blades flat, 20–40 cm. long, 1–3 cm. wide, glabrous or scabrous, the midrib rather prominent beneath; panicle nodding, 15–30 cm. long; spikelets

solitary, 5–6 mm. long, subtended by fine, minutely antrorsely scabrous hair-like bristles as much as 3 cm. long; glumes hyaline, the first nerveless, about half as long as the second, this 2.5–3 mm. long, 1-nerved; sterile and fertile lemma about equal, the sterile 5-nerved, with sometimes obscure lateral nerves, acuminate or short awn-tipped at apex, empty or enclosing a palea and sometimes a staminate flower; fertile lemma chartaceous-indurate, smooth, the apex acuminate or short awn-tipped, the margins hyaline, not inrolled; palea scaberulous on the upper half.

BRITISH NEW GUINEA: Central Division: Laloki River, *Brass 538* (GH, US), *Brass 3610* (A, US) (savannah gullies or in shelters of rocks); Mafulu, alt. 1250 m., *Brass 5513* (A, US) (forms small thickets in regrowth brush); Veiya, *Carr 11658* (US); Western Division: Daru Island, *Brass 6397* (A, US) (gregarious in thickets 2–3.5 meters high). NORTHEAST NEW GUINEA: Morobe District: Near Kajabit Mission, *Clemens 40793* (US); Wantoat, *Clemens 41172* (US); Finschhafen, *Lauterbach 24* (US). NETHERLANDS NEW GUINEA: Hollandia and vicinity, alt. 10 m., *Brass 8893* (A, US) (forming thickets 2–3 meters high on dry gravel beds in river); Balim River, alt. 1600 m., *Brass 11777* (A, US) (abundant on dry stony soil); Rouffaer River, alt. about 100 m., *Docters van Leeuwen 9727* (GH). NEW BRITAIN: *Naumann* in 1875 (US). SOLOMON ISLANDS: Bougainville: *Kajewski 2245* (GH); Ysabel: Tinibuli, *Herre 132* (NY).

East Indies and the Philippines to New Guinea and Australia.

18. Cenchrus L.

Cenchrus L., Sp. Pl. 1049. 1753.

Spikelets sessile, one to several together, permanently enclosed in a bristly or spiny involucre or bur, composed of more or less coalesced sterile branchlets; burs sessile or nearly so on a slender axis, its apex produced into a short point beyond the uppermost bur, the burs falling entire, the grains germinating within them; spikelets lanceolate; glumes membranous, the first 1-nerved, narrow, sometimes wanting, the second 3–5-nerved, usually shorter than the spikelet; sterile lemma about equal to the fertile one, membranous, 3–5-nerved, enclosing a well-developed palea and often a staminate flower; fertile lemma indurate, membranous near the tip, the margins clasping the palea but not inrolled. Annuals (ours) or perennials with flat blades and spikelike racemes of burs, the burs readily deciduous.

TYPE SPECIES: *Cenchrus echinatus* L.

KEY TO THE SPECIES

1. Burs not densely crowded in the racemes; lobes of the involucre not interlocking; first glume present ..... 1. *C. echinatus.*
1. Burs densely crowded; lobes of the involucre interlocking; first glume wanting .... 2. *C. Brownii.*

1. **Cenchrus echinatus** L., Sp. Pl. 1050. 1753; Chase, Contr. U. S. Nat. Herb. **22**: 58–62. *fig. 12.* 1920. Type probably from Jamaica.

Annual; culms somewhat compressed, glabrous, or scabrous below the inflorescence, ascending from a geniculate or decumbent base and usually branching and rooting from the base and lower nodes, 25–60 (sometimes to 100) cm. long; sheaths usually overlapping, glabrous or more or less pubescent, especially on the margins toward the summit, loose, somewhat

keeled; ligule ciliate, about 1 mm. long; blades flat, 6–20 cm. long, 3–8 mm. wide, scabrous or sparsely pilose on the upper surface; racemes often rather long-exserted in age, 3–10 cm. long, less dense than those of *C. Brownii,* the axis scabrous; burs truncate at base, the body 4–7 mm. high, as broad or broader, pubescent, the outer slender bristles usually less numerous than in *C. Brownii,* the inner bristles stout, usually broadened at the base and equaling the lobes of the body or shorter; lobes of the body commonly 10, often pilose, erect or bent inward, sometimes one or two of the lobes inflexed; spikelets 3–6, lanceolate, acuminate, about equaling the lobes or shorter, 4.5–6 mm. long; first glume narrow, 1-nerved; second glume two-thirds to three-fourths as long as the subequal sterile and fertile lemmas.

BRITISH NEW GUINEA: Gulf Division: Kanosia, *Carr 11180* (NY) (open savannah land). NORTHEAST NEW GUINEA: Morobe District: 4 miles south of Langemak Bay (near Finschhafen), *Sawyer 82* (A, US).

Tropics of both hemispheres.

2. **Cenchrus Brownii** Roem. and Schult., Syst. Veg. 2: 258. 1817; Chase, Jour. Arnold Arb. 20: 313. 1939. Based on *Cenchrus inflexus* R. Br.

Cenchrus inflexus R. Br., Prod. Fl. Nov. Holl. 1: 195. 1810 (non Poir. 1804). Type from Australia.

Cenchrus viridis Spreng., Syst. Veg. 1: 301. 1825; Chase, Contr. U. S. Nat. Herb. 22: 57. *fig. 11.* 1920. Type from Guadeloupe.

Annual; culms glabrous or scabrous below the inflorescence only, often rather robust, 30–100 cm. tall, erect or ascending from a more or less geniculate base, sparingly branching from the base or lower nodes; sheaths glabrous, rather loose, keeled, overlapping or sometimes shorter than the internodes; ligule a row of hairs scarcely 1 mm. long; blades flat, 10–30 cm. long, 6–15 mm. wide, the upper surface and margins scabrous; racemes short-exserted, 5–12 cm. long, dense; burs depressed-globose, the body about 4 mm. high and as broad or broader, puberulent, tawny, the outer bristles very slender, numerous, crowded toward the base, the inner stouter, about equal to or longer than the body and the spikelet, retrorsely scabrous; lobes of the body 6–8, interlocking at maturity; spikelets about 3 per bur, lanceolate, acuminate, 4–5 mm. long; first glume wanting, otherwise spikelets similar to those of *C. echinatus.*

BRITISH NEW GUINEA: *MacGregor 5* (US); Western Division: Daru Island, *Brass 6395* (A, US) (plantation weed, not plentiful).

Indo-China and the East Indies to the Philippines, New Guinea, and Australia. Also in tropical America.

Closely related to *Cenchrus echinatus,* but differing in its more erect habit, usually broader blades, usually smaller burs with fewer spikelets and interlocking lobes, and in the absence of a first glume. Many collections reported from this region as *C. echinatus* are probably *C. Brownii,* which is much more common. *Cenchrus echinatus* is a native of the New World and has probably been introduced into New Guinea.

19. Isachne R. Br.

Isachne R. Br., Prodr. Fl. Nov. Holl. 1: 196. 1810.

Spikelets subglobose or ovoid, 2-flowered; glumes membranous, subequal, as long as the florets or slightly shorter (rarely exceeding the florets),

tardily deciduous, leaving the naked florets attached to the clavate pedicels; florets similar, indurate and both perfecting fruits, or the lower staminate only, usually larger than the upper and of a thinner texture, the two florets remaining attached by the minute rachilla joint and falling together. Annuals or perennials with flat blades and open or contracted panicles.

TYPE SPECIES: *Isachne australis* R. Br. = *I. globosa* (Thunb.) Kuntze.

KEY TO THE SPECIES

1. Lower floret staminate, not indurate, usually more flattened and larger than the upper.
   2. Upper floret distinctly pubescent; panicle branches with glandular bands.
      3. Spikelets 1.2–1.5 mm. long; lower floret grooved on the back..10. *I. miliacea.*
      3. Spikelets 2–3 mm. long; lower floret rounded on the back.....11. *I. globosa.*
   2. Both florets glabrous or essentially so; panicle branches without glandular bands.. .....9. *I. Brassii.*
1. Lower floret mostly perfect, sometimes slightly larger than the upper, but both florets of a similar texture.
   4. Glumes 2.5–3.5 mm. long, appressed-hispid, considerably exceeding the florets.. .....4. *I. Schmidtii.*
   4. Glumes not more than 2 mm. long, about equaling or slightly exceeding the florets.
      5. Plants low, creeping, the upright branches not more than 15 cm. tall; blades 1.5 cm. long or less; panicles contracted, less than 2 cm. long.
         6. Spikelets 1–1.5 mm. long; plants 2–6 cm. tall.....5. *I. Myosotis.*
         6. Spikelets 1.8–2 mm. long; plants 10–15 cm. tall.....6. *I. pauciflora.*
      5. Plants not as above; panicle 2–30 cm. long, more or less open.
         7. Sheaths less than 1 cm. long, mostly tuberculate-hispid, the internodes 3–8 times as long; ligule wanting.....3. *I. confusa.*
         7. Sheaths much longer in proportion to the internodes; ligule a ring of hairs.
            8. Culms rigid, erect, ascending, or sometimes sprawling.
               9. Culms 65–150 cm. tall; panicle branches ascending or spreading; rachilla terete.
                  10. Panicle axis, branches, and pedicels smooth or nearly so; panicle 15–25 cm. long.....1. *I. albens.*
                  10. Panicle axis, branches and pedicels distinctly scabrous; panicle mostly 8–15 cm. long.....2. *I. arfakensis.*
               9. Culms 30–45 cm. tall; panicle branches stiffly erect; rachilla flattened.. .....7. *I. obtecta.*
            8. Culms weak, decumbent at base and rooting from the lower nodes.
               11. Florets glossy, the rachilla flattened.....9. *I. Brassii.*
               11. Florets papillose-roughened or pubescent, the rachilla terete..... .....8. *I. villosa.*

1. **Isachne albens** Trin., Sp. Gram. Ic. 1: *pl. 85.* 1827; Chase, Jour. Arnold Arb. 24: 87. 1943. Type from India.

Panicum albens (Trin.) Steud., Syn. Pl. Glum. 1: 96. 1854.

Isachne stricta Elmer, Leaflets Philip. Bot. 2: 463. 1908; Chase, Jour. Arnold Arb. 24: 88. 1943. Type from the Philippines.

Isachne elatiuscula Ohwi, Bot. Mag. (Tokyo) 56: 5. 1942. Type from New Guinea.

Culms rather slender, erect or sprawling, 60–150 cm. tall; sheaths rather loose, the lower shorter than the internodes, the upper often overlapping, more or less ciliate on the margins especially above, the hairs continuous with the ligule, this represented only by a row of hairs about

2 mm. long; blades rather firm, 8–18 cm. long, 5–15 mm. wide, glabrous to scabrous to appressed stiff-pubescent, the margins usually strongly scabrous, often revolute when dry; panicle pyramidal, 15–25 cm. long, the axis and branches smooth or nearly so, the branches ascending or spreading when mature, rather rigid and densely flowered to loosely flowered and more or less lax; spikelets 1.3–1.8 mm. long, subglobose; glumes equal, 7-nerved, equaling the spikelet or slightly shorter, glabrous or more or less hispid toward the tips; florets alike, orbicular to elliptic, obtuse, glabrous or puberulent, the short rachilla terete.

NORTHEAST NEW GUINEA: Morobe District: Yunzaing, alt. about 1300 m., *Clemens 4105* (A, US) (seepage over rock slope); Ogeramnang, alt. 1600–1700 m., *Clemens 4592* (A), *5409, 6958a* (A, US); Samanzing, alt. about 2000 m., *Clemens 9239* (US) (margin of mountain rivulet), *Clemens 10379* (US) (hamlet watercourse, on the bank with *Glyceria*). NETHERLANDS NEW GUINEA: Bele River, 18 km. northeast of Lake Habbema, alt. 2200 m., *Brass 11559* (A, US) (common in open secondary forest; scrambling or in suberect clumps 1–1.5 meters high); Angi, Arfak Mountains, alt. 1900 m., *Kanehira & Hatusima 14019* (type coll. of *I. elatiuscula*, A) (in the forest by Lake Gita).

Indo-Malayan region to New Guinea.

Isachne elatiuscula Ohwi is described as differing from *I. albens* in its firmer and denser panicle. Examination of an isotype (A) shows that the panicle is more dense and the panicle branches more densely flowered than typical *I. albens*. This character does not seem to be reliable, however, when it is seen that there are numerous intergrades between specimens with open panicles and loosely flowered branches and those of the type represented by *I. elatiuscula*.

Clemens 6958a was cited as *Isachne scabrosa* Hook. f. by Chase (18, p. 87).

2. **Isachne arfakensis** Ohwi, Bot. Mag. (Tokyo) 56: 4. 1942. Type from New Guinea.

Culms ascending or sprawling, freely branching, 65–110 cm. tall, scabrous below the inflorescence, otherwise glabrous and smooth; sheaths mostly shorter than the internodes, ciliate on the margins, the hairs continuous with the 2 mm. long ciliate ligule, the sheaths otherwise glabrous or slightly pubescent toward the summit; blades flat, rather firm, 5–15 cm. long, 6–12 mm. wide, seabrous above, more or less appressed-pubescent below, the margins scabrous; panicle 8–20 cm. long, oblong-ovate, the axis and stiffly ascending branches scabrous; spikelets subglobose, 1.5–1.8 mm. long; glumes 7-nerved, equaling the spikelet or the first slightly shorter, obtuse, glabrous or minutely scaberulous, the tips sometimes hispid; florets subequal, glabrous or minutely puberulent, especially on the margins, separated by a very short terete rachilla.

BRITISH NEW GUINEA: Central Division: Mt. Tafa, alt. 2400 m., *Brass 4871* (GH, US) (plentiful on open banks of a small stream flowing over landslide debris). NORTHEAST NEW GUINEA: Morobe District: Samanzing, alt. 1800 m., *Clemens 9209* (US) (landslide near little waterfall). NETHERLANDS NEW GUINEA: Angi, Arfak Mountains, alt. 1900 m., *Kanehira & Hatusima 13588* (TYPE FRAGMENT, A) (in open marsh by Lake Gita).

Known only from New Guinea.

In the original description, Ohwi describes this species as having blades

5–8 cm. long, 6–7 mm. wide, and a panicle about 8 cm. long. The Brass specimen (at US) is a good match for the type except that the blades are up to 9 mm. wide and the panicles are 10–14 cm. long. A duplicate of this same Brass collection (at GH) has blades more than 15 cm. long and 12 mm. wide. The panicle is 20 cm. long. In all other respects these specimens agree well with each other and with Ohwi's original description and a fragment of the type (at A). *Brass 4817* [*4871*] was reported as *Isachne pangerangensis* Zoll. and Mor. by Hitchcock (35, p. 123) and as *I. scabrosa* Hook. f. by Chase (18, p. 87).

3. **Isachne confusa** Ohwi, Tokyo Sci. Mus. Bull. 18: 14. 1947. Type from Sumatra.
Isachne firmula sensu Hitchc., Brittonia 2: 123. 1936.
Isachne Rhignon (Steud.) Ohwi, Bot. Mag. (Tokyo) 55: 541. 1941, excl. syn.

Culms erect or spreading, 15–60 (commonly about 30) cm. tall, simple below, branching from the upper nodes, the internodes elongate; sheaths much shorter than the internodes, about 0.5 cm. long, glabrous to tuberculate-hispid; ligule wanting; blades lanceolate, firm, prominently nerved, usually scabrous above, the margin often pectinate, 10–20 mm. long, 4–8 mm. wide; panicle 2–4 cm. long, 1.5–3 cm. wide, the branches stiffly divergent, some of them with glandular bands; pedicels rather stout, clavate, these and the panicle branches glabrous; spikelets about 1.3 mm. long, the obtuse hispid glumes barely equaling the florets; florets alike, both perfect, pale to tawny, granular-roughened, about 1 mm. long.

British New Guinea: Western Division: Wuroi, Oriomo River, *Brass 5854* (GH, US) (small area of tea tree marsh on savannah); Lake Daviumbu, Middle Fly River, *Brass 7832* (A, US) (scattered through coarser grass on wet plain).

India, China, Philippines, Netherlands Indies to New Guinea.

4. **Isachne Schmidtii** Hack., Bot. Tidsskrift 24: 97. 1901. Type from Siam.
Isachne semitalis Ridl., Fl. Malay Peninsula 5: 237. 1925. Type from Malay Peninsula.

Annual; culms creeping, the ascending flowering branches 5–20 cm. tall; sheaths overlapping or slightly shorter than the internodes, glabrous except for the ciliate margins, the hairs on the upper part stiff and continuous with the ciliate ligule, this about 1 mm. long; blades lanceolate to ovate-lanceolate, 1.5–5 cm. long, 5–9 mm. wide, glabrous to more or less scabrous-hispid especially below, the margins prominently scabrous; panicle contracted to rather open, 1–4 cm. long, the scabrous, angled branches stiffly ascending; spikelets 2.5–3.5 mm. long on clavate pedicels; glumes rigid-hispid, ovate, exceeding the florets, subequal, the lower slightly longer; florets similar, oval or elliptic, obtuse, one-fourth to one-third (rarely half) shorter than the glumes, glabrous or the lemmas slightly hispid on the inrolled margins.

Solomon Islands: Ysabel: Tiratona, *Brass 3405* (GH) (shady pathways in mountain forests).

Siam, Malay Peninsula, Philippines to New Guinea.

Hackel described the species as only about 6 cm. tall and with the glumes twice as long as the florets. A specimen in the National Herbarium (obtained from the Hackel Herbarium in Vienna by Agnes Chase and labeled *Isachne Schmidtii* in Hackel's handwriting) is a tiny plant only about 4.5 cm. tall and with a small panicle of only 4 spikelets. Except

for its size, the plant agrees in all respects with the cited specimen and with others like it from the Malay Peninsula and the Philippines. The species seems well characterized by its rather large spikelets with pointed hispid glumes noticeably longer than the florets.

5. **Isachne Myosotis** Nees, Jour. Bot. Kew Misc. 2: 98. 1850; White, Proc. Roy. Soc. Queensl. 34: 16. 1923. Type from the Philippines.
Panicum Myosotis (Nees) Steud., Syn. Pl. Glum. 1: 96. 1854.
Isachne grisea K. Schum. in K. Schum. and Lauterb., Nachtr. Fl. Deutsch.Schutzgeb. Südsee 57. 1905; Ohwi, Bot. Mag. (Tokyo) 56: 4. 1942. Type from Northeast New Guinea.
Isachne micrantha Merr., Philip. Jour. Sci. Bot. 5: 168. 1910; Chase, Jour. Arnold Arb. 24: 87. 1943. Type from the Philippines.

Low annual; culms freely branching, more or less tufted or creeping and forming mats, the flowering branches 2–6 cm. tall; sheaths overlapping, sparsely to densely pilose, the hairs sometimes tuberculate-based; ligule a row of hairs about 1 mm. long continuous with the ciliate margins of the sheaths; blades ovate to ovate-lanceolate, 5–15 cm. long, 2–4 mm. wide, densely pubescent to papillose-pilose, the hairs rarely somewhat appressed; panicle exserted, few-flowered, 7–16 mm. long, the branches usually strict, glabrous; spikelets 1–1.5 mm. long, subglobose when mature, the glumes similar, about equaling the spikelet, obtuse, subglabrous to rather densely hispid (usually with a few stiff hairs at least toward the tips); florets similar in appearance, about 1 mm. long or slightly more, more or less densely puberulent.

BRITISH NEW GUINEA: Central Division: Murray Pass, Wharton Range, alt. 2840 m., *Brass 4642* (GH, US) (appearing early on burnt grasslands); Rouna, *Carr 12412* (NY) (seepage point above south bank of Laloki River); Nauro–Elobi Divide, *Carr 12971* (US). NORTHEAST NEW GUINEA: Morobe District: Sattelberg, alt. about 90 m., *Clemens 312* (A, US); Sarawaket, alt. about 250 m., *Clemens 6097* (A); Wantoat, alt. about 100 m., *Clemens 40885* (US). NETHERLANDS NEW GUINEA: Lake Habbema, alt. 3225 m., *Brass 9556* (A, US) (locally plentiful on open boggy ground); 9 km. northeast of Lake Habbema, alt. 2800 m., *Brass 10704* (A) (plentiful on native clearing in forest); Bele River, 18 km. northeast of Lake Habbema, alt. 2200 m., *Brass 11583* (A, US) (abundant in native gardens); 4 km. southwest of Bernhard Camp, Idenburg River, alt. 850 m., *Brass 13201* (A, US) (matted on flood washed rocks on river bank); Nassau Region, Explorat Biv., alt. about 1200 m., *Docters van Leeuwen 10787* (GH).

Philippines and New Guinea.

The type specimen of *Isachne Myosotis* (fragment at US) has spikelets 1.2–1.5 mm. long, with glumes prominently hispid. The type of *I. micrantha* (US) has spikelets 1–1.3 (rarely 1.5) mm. long, glumes subglabrous or with only a few hairs near the apex, and the lemmas perhaps slightly more hairy than is usual for *I. Myosotis*. In other respects they are very similar, having the same characteristic habit and foliage. No type material of *I. grisea* was available for comparison, but from the description and study of material from near the type locality, it seems evident that it is merely a synonym of *I. Myosotis*.

Carr 12971 is a somewhat taller plant than usual, but the culms are very slender and the blades thin. It is probably a shade form and a note on the label states "path in forest."

Brass 4642 was cited as *Isachne pauciflora* by Hitchcock (35, p. 123).

6. **Isachne pauciflora** Hack., (Philip.) Bur. Govt. Lab. Bull. 35: 80. 1906.
Type from the Philippines.

Aquatic or semi-aquatic; culms weak, rooting below, the flowering branches 10–15 cm. long, glabrous; sheaths rather loose, about half as long as the internodes, more or less densely papillose-hirsute, especially below, the margins ciliate and continuous with the ligule, this about 1 mm. long; blades ovate-lanceolate, acute, 1–1.5 cm. long, about 4 mm. wide, subglabrous or more or less papillose-pilose, the hairs sometimes appressed, the margins scabrous; panicle few-flowered, strict, contracted, about 1.5 cm. long, the rachis and stiff branches glabrous; spikelets 1.8–2 mm. long; glumes equaling the spikelet, obtuse or appearing apiculate by the inrolling of the margins in drying, more or less densely hispid especially toward the tips; florets equal or nearly so, broadly oval, obtuse, densely puberulent, 1.5–1.8 mm. long.

BRITISH NEW GUINEA: Base of Rouna Falls, *Carr 12362* (NY US) (on rocks exposed to continual sprays).

Philippines and New Guinea.

Similar to *Isachne Myosotis* and perhaps not distinct from that species. The only noticeable differences are the elongated culms with sheaths about half as long as the internodes, and the slightly larger spikelets. The cited specimen compares favorably with a type duplicate (at US).

7. **Isachne obtecta** sp. nov. PLATE IV.

Perennis 30–45 cm. alta; culmis caespitosis, glabris, suberectis vel adscendentibus, circiter 1 mm. diametro; nodis glabris, eis infra medium culmi saepe ramiferis; vaginis glabris quam internodiis brevioribus, marginibus ciliatis; ligula ad lineam ciliatam 2–3 mm. longa reducta; laminis lanceolato-linearibus, 2–6 cm. longis, 3–6 mm. latis, acutis, subcordatis, praecipue subtus plus minusve villosis, supra saepe pilis paucis adspersis, marginibus scabris; panicula longe exserta, 5–8 cm. longa, contracta, ramis rigidis, erectis, floribus confertis; rhachi ramisque teretibus, glabris vel sub lente minute scaberulis; pedicellis clavatis; spiculis glabris, 1.5 mm. longis; glumis aequalibus, ellipticis vel plus minusve obovatis, nervis obscuris, circiter 7, marginibus scariosis, paene flosculas obtegentibus; flosculis aequalibus et fructiferis, ellipticis, nitidis, rhachilla complanata junctis, floscula infima interdum paulum dorso-complanata.

BRITISH NEW GUINEA: Western Division: Palmer River, 2 miles below junction with Black River, alt. 100 m., *Brass 7242* (A, TYPE, US) July, 1936 (common in native gardens).

In some respects this species suggests *Isachne Brassii*, but it is readily distinguished by the more upright firmer culms, somewhat villous blades, the much contracted panicle, and the slightly smaller spikelets with glumes almost completely covering the florets. The florets, moreover, are of almost exactly the same size and the tip of the upper is borne slightly above the lower. In *I. Brassii* the tips of the florets are borne at the same height and the upper floret is smaller and more convex on the back. The new species may also be compared with *I. villosa*, but that species has papillose-roughened or pubescent florets which are joined by a terete rachilla.

The specific epithet refers to the fact that the florets are almost completely covered by the glumes.

8. **Isachne villosa** (Hitchc.) comb. nov.

Isachne Brassii Hitchc. var. *villosa* Hitchc., Brittonia 2: 123. 1936; Chase, Jour. Arnold Arb. 24: 87. 1943. Type from British New Guinea.

Culms glabrous, branching at base, decumbent and rooting at the lower nodes, the ascending flowering branches 10–40 cm. tall; nodes bearded; sheaths more or less papillose-pilose, often densely so, sometimes only on the upper part, ciliate on the margins, the hairs continuous with the fringe of stiff hairs forming the ligule, this 1–2 mm. long; blades lanceolate, 1.5–10 cm. long, 3–7 mm. wide, more or less villous, usually densely so below; panicle open, 3–12 cm. long, the branches ascending, rather loosely flowered; spikelets 1.2–1.8 mm. long, upright on the pedicels; glumes about equaling the spikelet, elliptic to narrowly obovate, glabrous; florets similar, equal or the upper slightly smaller, separated by a short terete rachilla, both florets of the same texture, papillose-roughened and more or less puberulent, the hairs often rather long and curled; upper floret sometimes slightly more hairy than the lower.

BRITISH NEW GUINEA: Central Division: Mt. Tafa, alt. 2100 m., *Brass 4132* (TYPE COLL., GH, US) (small roadside grass); Borizi, alt. about 1400 m., *Carr 14271* (NY); without precise locality, *MacGregor 50* (US). NORTHEAST NEW GUINEA: Morobe District: Boana, alt. 700–1300 m., *Clemens 41714* (US); Kaile, alt. about 1600 m., *Clemens 4860* (A); Sarawaket, alt. about 1800 m., *Clemens 4956, 5856, 5924* (A). NETHERLANDS NEW GUINEA: 15 km. southwest of Bernhard Camp, Idenburg River, alt. 1500 m., *Brass 12370* (A, US) (rain-forest; on sand in the bed of a small stream); 18 km. southwest of Bernhard Camp, Idenburg River, alt. 2150 m., *Brass 12475* (A, US) (one small clump on an open rock slide).

Philippines, New Guinea.

Related to *Isachne Brassii* Hitchc., but differing in having a terete rather than flattened and obdeltoid rachilla; the florets papillose-roughened and more or less short-pubescent, the sheaths papillose-pilose, and the blades tomentose, at least on the lower surface. This species may also be compared with *I. Beneckii* Hack., but that species has subglobose spikelets with glumes broadly oval and more or less hispid, at least toward the tips.

9. **Isachne Brassii** Hitchc., Proc. Linn. Soc. N. S. Wales 54: 146. 1929, Brittonia 2: 123. 1936; Ohwi, Bot. Mag. (Tokyo) 56: 5. 1942. Type from British New Guinea.

Culms glabrous, branching at base, decumbent and rooting at the lower nodes, the ascending flowering branches 8–50 cm. tall; sheaths glabrous or minutely pubescent, the margins ciliate, the hairs continuous with the fringe of stiff hairs which forms the ligule, this 1–2 mm. long; blades narrowly oblong-lanceolate, 1.5–7 cm. long, 3–8 mm. wide, scabrous on both surfaces and sometimes with a few scattered stiff hairs; panicle elliptic, 3–10 cm. long, open, the branches ascending, the spikelets short-pediceled along the main branches; spikelets 1.5–1.7 mm. long, borne obliquely on the pedicels; glumes about equaling the spikelet, narrowly obovate, more or less hispid especially toward the tips; florets essentially glabrous and more or less glossy, equal in height but the lower larger, often grooved on the back and of a slightly thinner texture, the upper more convex on the back and separated from the lower by a flattened rachilla which is broader at the apex. When seen before the glumes have fallen

the two florets appear similar, as the slight difference in texture is not striking.

BRITISH NEW GUINEA: Gulf Division: Ihu, Vailala River, *Brass 1018* (TYPE COLL., GH, US) (small swamp grass); Western Division: Palmer River, 2 miles below junction with Black River, alt. 100 m., *Brass 7364* (A, US) (matted on sand drifts in river). NORTHEAST NEW GUINEA: Morobe District: *Ledermann 10444* (US); Boana, alt. about 900 m., *Clemens* (sine coll. no.), October 20, 1940 (US). NETHERLANDS NEW GUINEA: Bernhard Camp, Idenburg River, alt. 50 m., *Brass 14055* (A, US) (massed on logs floating in backwater lagoons); Waren, 60 miles south of Manokwari, alt. 3 m., *Kanehira and Hatusima 14221* (A) (on edge of rain-forest).

Endemic.

10. **Isachne miliacea** Roth ex Roem. and Schult., Syst. Veg. 2: 476. 1817; Ridley, Trans. Linn. Soc. II. Bot. 9: 247. 1916; Blatter and McCann, Imp. Council Agric. Res. Sci. Monogr. 5: *pl. 123*. 1935. Type from eastern India.

Culms weak, decumbent and creeping, the ascending flowering branches 6–20 (rarely to 30) cm. tall; nodes usually bearded; sheaths shorter than the internodes, glabrous except for the ciliate margin, the cilia continuous with the stiff hairs forming the ligule; blades narrowly oblong, 1–3 cm. long, 3–6 mm. wide, acute, subcordate at base, hispidulous or glabrous, the margins scaberulous; panicle open, 2–5 cm. long, included at base, the branches glandular, ascending, up to 1.5 cm. long; spikelets 1.2–1.5 mm. long; glumes subequal, smooth or scaberulous toward the summit; lower floret staminate, equaling or slightly longer than the glumes, the lemma commonly grooved down the center at maturity; upper floret perfect, ovoid, puberulent, separated from the lower floret by a flattened rachilla.

Indo-Malayan region to New Guinea.

No New Guinea specimens of this species were seen. The description was drawn up from Philippine material. It is included here since it has been reported from Netherlands New Guinea, and its occurrence in New Guinea seems probable.

11. **Isachne globosa** (Thunb.) Kuntze, Rev. Gen. Pl. 2: 778. 1891; Chase, Jour. Arnold Arb. 20: 312. 1939.

Milium globosum Thunb., Fl. Jap. 49. 1784. Type from Japan.

Isachne australis R. Br., Prodr. Fl. Nov. Holl. 1: 196. 1810; F. Muell., Pap. Pl. 2: 19. 1885; Blatter and McCann, Imp. Council Agric. Res. Sci. Monogr. 5: *pl. 122*. 1935. Type from Australia.

Isachne rhabdina (Steud.) Ohwi, Tokyo Sci. Mus. Bull. 18: 1. 1947.

Perennial; culms slender, spreading, often decumbent below and branching, rarely suberect from a tufted base, the flowering branches 15–70 cm. tall; sheaths mostly shorter than the internodes, smooth, ciliate on the margins, the hairs on the upper part longer and continuous with the ciliate ligule, this 2–3 mm. long; blades linear-lanceolate, 2–8 (rarely up to 13) cm. long, 3–8 mm. wide, rather firm in texture, scaberulous; panicle 2–10 cm. long, 2–6 mm. wide, the smooth or scabrous branches ascending and with more or less distinct glandular bands; spikelets 2–2.5 (rarely 3) mm. long; glumes equaling the spikelet or slightly shorter, glabrous or hispidulous toward the obtuse apex; lower floret staminate, slightly larger and of a thinner texture than the glabrous or pubescent perfect floret.

BRITISH NEW GUINEA: Central Division: Vanapa Valley, Urunu, alt. 1900 m., *Brass 4807* (GH, US) (very plentiful in grassland swamps); Western Division: Lake Daviumbu, Middle Fly River, *Brass 7602* (A, US) (plentiful on shores of lake). NETHERLANDS NEW GUINEA: 9 km. northeast of Lake Habbema, alt. 2800 m., *Brass 10743* (A, US) (abundant on a native clearing in the forest); Bele River, 18 km. northeast of Lake Habbema, alt. 2200 m., *Brass 11542* (A, US) (plentiful on sandy beaches of river and on old garden lands); Balim River, alt. 1600 m., *Brass 11823* (A, US) (plentiful on deforested slopes).

Japan to India, Malaysia, New Guinea and Australia.

Brass 7602 is a more robust plant than the others cited, the spikelets are slightly larger and with glumes shorter than the spikelets. Comparison with specimens from other parts of the range, however, show that these differences fall well within the range of variation of the species.

Brass 4807 was cited as *Isachne pangerangensis* Zoll. and Mor. by Hitchcock (35, p. 123).

20. Spinifex L.

Spinifex L., Mant. 2: 163, 300. 1771.

Spikelets lanceolate, unisexual, the pistillate solitary at the base of a long stiff or somewhat flexuous rachis, these stellately arranged in dense spatheate umbels, the heads breaking off at maturity and carried about by the wind or floating on the sea; staminate spikelets borne on rigid spikes, these in spatheate umbels like the pistillate; glumes membranous, the first about half the length of the staminate spikelet, in the pistillate equal to the spikelet; fertile lemma chartaceous-indurate, acuminate, the margins not inrolled. Coarse dioecious perennials with rigid involute or subulate blades and stiff stellate inflorescences.

TYPE SPECIES: *Spinifex squarrosus* L. = *S. littoreus* (Burm. f.) Merr. (*Stipa littorea* Burm. f.).

1. **Spinifex littoreus** (Burm. f.) Merr., Philip. Jour. Sci. Bot. 7: 229. 1912.
   Stipa littorea Burm. f., Fl. Ind. 29. 1768. Type from India.
   Stipa spinifex L., Mant. 1: 34. 1767. Type from India.
   Spinifex squarrosus L., Mant. 2: 300. 1771. Type from India.

Perennial; culms hard, 30–100 cm. or more tall, the internodes more or less pruinose; sheaths broad, overlapping, glabrous or the margins ciliate; ligule a dense ring of hairs 2–4 mm. long; blades 5–20 cm. long, involute-subulate, usually curved, glabrous or the margins scabrous, the tips sharp-pointed; staminate spikelets 2-flowered, 10–12 mm. long, usually several on each spike, the rachis 4–9 cm. long and terminating in a stiff point beyond the spikelets; glumes unequal, the first 5–6 mm. long, the second slightly shorter than the spikelet; florets subequal, the lower membranous, the palea with prominently winged ciliate keels, the upper slightly indurated, the palea not keeled; pistillate spikelets 10–12 mm. long, borne at the base of the scabrous rachis, this 8–15 cm. or more long; first glume equal to or exceeding the spikelet; second glume and sterile lemma equal, the latter empty; fertile lemma a little shorter than the sterile lemma and enclosed within it.

Sandy coasts from India to South China and Malaysia.

1a. **Spinifex littoreus** (Burm. f.) Merr. var. **longifolius** (R. Br.) Backer, Handb. Fl. Java 2: 188. 1928.
   Spinifex longifolius R. Br., Prodr. Fl. Nov. Holl. 1: 198. 1810; Pilger, Nat. Pflanzenfam. ed. 2. 14e: 94. *fig. 58*. 1940. Type from Australia.

Differs from the species in having longer often broader and weaker blades (20–50 cm. long), the apex not rigidly pointed, and the rachis of the pistillate inflorescence more slender.

BRITISH NEW GUINEA: Central Division: Hisiu, *Carr 11445* (US, NY). Australia, New Guinea, and Java.

21. Thuarea Pers.

Thuarea Pers., Syn. Pl. 1: 110. 1805.
Ornithocephalochloa Kurz, Jour. Bot. 18: 332. 1875.

Spikelets of two kinds borne in a terminal one-sided raceme included within a sort of spathe at anthesis, the lower 1 or 2 spikelets perfect or pistillate, the upper 3–6 staminate; rachis broad at the base and more or less enclosing the lowest spikelet, narrowed above; upper spikelets with two similar staminate florets, or the lower floret empty; lower 1 or 2 spikelets with one staminate or empty floret and one perfect or pistillate floret. Slender creeping beach grasses. As the fruit matures, the staminate spikelets on the upper part of the rachis fall off and the rachis begins to bend forward and finally encloses the ripened fruit within the perfect spikelet. As this is occurring, the upright branch bends by unequal growth at two or three nodes and the fruit is buried in the sand. The fructification thus formed is more or less waterproof and the seed inside is protected and may float for a considerable time in salt water without injury.[17]

TYPE SPECIES: *Thuarea sarmentosa* Pers. = *T. involuta* (G. Forst.) R. Br. (*Ischaemum involutum* G. Forst.).

1. **Thuarea involuta** (G. Forst.) R. Br.[18] ex Roem. and Schult., Syst. Veg. 2: 808. 1817; Hack., Denkschr. Akad. Wiss. Math.-Naturw. (Wien) 89: 495. 1913.
Ischaemum involutum G. Forst., Fl. Ins. Austr. Prodr. 73. 1786. Habitat in the Society Islands and here and there in the tropics.
Thuarea sarmentosa Pers., Syn. Pl. 1: 110. 1805; Kunth, Rev. Gram. 2: 247. *pl. 35.* 1830; K. Schum. and Lauterb., Fl. Deutsch. Schutzgeb. Südsee 182. 1901. Type from Madagascar.
Ornithocephalochloa arenicola Kurz, Jour. Bot. 18: 332. *pl. 171, fig. 1–18.* 1875. Type from Nicobar Islands.

Culms creeping, forming mats, the upright flowering branches 5–20 cm. tall; sheaths and blades glabrous to more or less velvety-pubescent; sheaths overlapping, ciliate on the margins; ligule a row of hairs 0.5–1 mm. long; blades lanceolate, 2–5 cm. long, 3–6 mm. wide; inflorescence a terminal raceme, the spikelets borne in one series on the puberulent rachis; spikelets puberulent, the staminate about 4 mm. long; first glume small, hyaline; second glume about as long as the spikelet; florets similar, the upper lemma slightly firmer, both containing a staminate flower, or the lower empty; perfect spikelets slightly larger, the glumes and sterile lemma similar to those of the staminate spikelets, the lemma containing a palea and sometimes a staminate flower; fertile floret perfect or pistillate, the lemma smooth and shining except for a few hairs at the apex, the margins clasping the lemma but not inrolled.

17 For a detailed discussion of this interesting phenomenon, see Nieuwenhuis-Uexküll, Margarete (Ann. Bot. Jard. Buitenzorg 18: 114–123. *pl. 14, 15.* 1902).

18 Robert Brown (Prodr. Fl. Nov. Holl. 1: 197. 1810) mentions *Ischaemum involutum* G. Forst. under *Thuarea,* but the combination is not made there.

BRITISH NEW GUINEA: Central Division: Hisiu, *Carr 11417* (NY) (sandy beach). SOLOMON ISLANDS: San Cristoval: Star Harbor, *Brass 3070* (GH).

Islands of the Indian Ocean to Malaysia, New Guinea, Northern Australia, and Islands of the Pacific.

22. Melinis Beauv.

Melinis Beauv., Ess. Agrost. 54. *pl. 11, fig. 4.* 1812.

Tristegis Nees, Hor. Phys. Berol. 47. *pl. 7.* 1820.

Spikelets small, ovate to elliptic, somewhat laterally compressed; first glume minute, nerveless; second glume equaling the sterile lemma, prominently nerved, 2-lobed at apex and bearing a short mucro from between the lobes; sterile lemma similar to the second glume, but bearing a long straight and slender awn; fertile lemma and palea weakly cartilaginous, shorter than the sterile lemma. Annuals or perennials with small spikelets borne in panicles.

TYPE SPECIES: *Melinis minutiflora* Beauv.

1. **Melinis minutiflora** Beauv., Ess. Agrost. 54, *pl. 11, fig. 4.* 1812. Type from Brazil.

   Tristegis glutinosa Nees, Hor. Phys. Berol. 29, 47, 54, *pl. 7.* 1820. Type from Brazil.

   Panicum Melinis Trin., Mém. Acad. St. Petersb. VI. Sci. Nat. 1: 291. 1834. Based on *Melinis minutiflora* Beauv.

Glandular perennial; culms 1 meter or more long, erect or geniculately ascending, often rooting from the lower nodes, usually much branched, glabrous or somewhat pubescent; nodes bearded; sheaths papillose-pilose; ligule a ring of whitish hairs about 1 mm. long; blades flat, pubescent, 5–15 cm. long, 5–12 mm. wide; panicle narrow, more or less contracted, densely flowered, 15–25 cm. long, the slender branches and pedicels scaberulous; spikelets 1.8–2 mm. long, the awn of the sterile lemma 10–15 mm. long.

NORTHEAST NEW GUINEA: Morobe District: Boana, alt. 700–1400 m., *Clemens 11361* (US).

EXPLANATION OF PLATES

All figures are drawn from types.

Plate I

Brachiaria fusiformis Reeder (*Brass 3639*): a. habit, × ½; b & c. two views of spikelet; d. fertile floret (b-d, × 10).

Plate II

Digitaria abortiva Reeder (*Carr 11108*): a. habit, × ½; b. part of rachis; c & d. two views of spikelet (b-d, × 10).

Plate III

Setaria montana Reeder (*Brass 11488*): a. habit, × ½; b & c. two views of spikelet, × 10.

Plate IV

Isachne obtecta Reeder (*Brass 7242*): a. habit, × ½; b. complete spikelet; c & d. two views of spikelet with glumes removed (b-d, × 10).

(*To be concluded*)

GRAMINEAE-PANICOIDEAE OF NEW GUINEA

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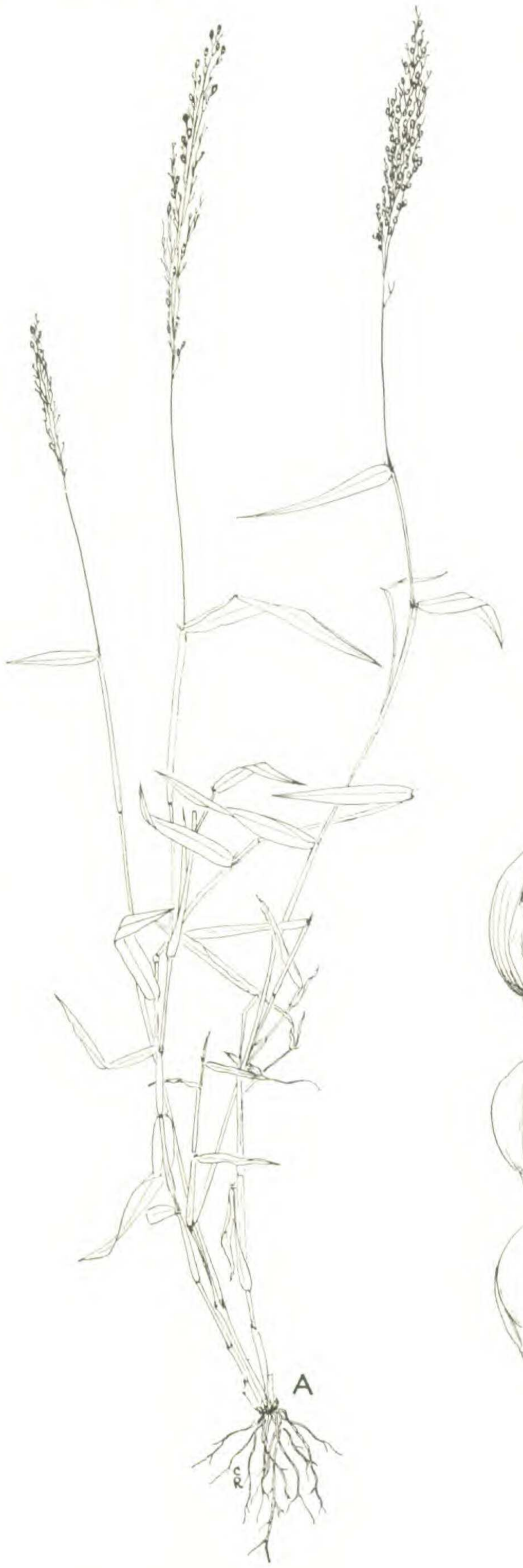

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THE GRAMINEAE-PANICOIDEAE OF NEW GUINEA

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Concluded from page 319

Tribe II. ANDROPOGONEAE

Spikelets 2-flowered, the lower floret often reduced, in pairs (rarely in threes or solitary), one of the pair sessile, the other pediceled, both spikelets similar or more often dissimilar, the sessile spikelet then usually pistillate or perfect and the pediceled staminate or neuter, rarely wanting and only the pedicel remaining (in *Sclerandrium* the sessile spikelets staminate and the pediceled perfect); spikelets falling entire at maturity; rachis either continuous, the spikelets falling free, or articulate, the sessile spikelet falling with the rachis-joint and pedicel attached; glumes more or less indurate, firmer than the lemmas, the first always longer than the florets;. lemmas membranous or hyaline, the upper (fertile) usually with a geniculate awn from the tip or from between the lobes of a bifid apex; stigmas 2, stamens 3 (rarely 1 or 2). Annuals or perennials with often tall culms and solitary, digitate or panicled spikelike racemes.

KEY TO THE GENERA

1. Spikelets strongly laterally compressed, solitary at each node.....23. *Dimeria.*
1. Spikelets dorsally compressed or rounded, usually 2–3 at each node (sometimes solitary by the suppression of the pediceled spikelet).
   2. Spikelets all alike and fertile, or if unlike the sessile spikelet staminate, the pediceled perfect (sometimes the pediceled spikelets reduced in *Microstegium*).
      3. Sessile spikelets perfect, pediceled spikelets usually also perfect.
         4. Rachis continuous, not disarticulating, the spikelets falling free (see also *Eulalia irritans*).
            5. Spikelets awnless, borne in narrow spikelike panicles.....24. *Imperata.*
            5. Spikelets awned (in ours), borne in broad flabellate panicles.....25. *Miscanthus.*
         4. Rachis disarticulating, the sessile spikelets falling with the rachis joint and pedicel attached.
            6. Racemes numerous, paniculate on an elongate common axis.
               7. Fertile lemma awnless, usually much reduced.....26. *Saccharum.*
               7. Fertile lemma well developed, mucronate or with a well developed awn..27. *Erianthus.*

6. Racemes 1 — several, subdigitate or approximate on a shortened common axis.
8. Racemes several, subdigitate or approximate; spikelets 1-awned, or if 2-awned the awns dissimilar.
9. Culms erect or ascending; blades linear; first glume flat or with only a slight groove.....28. *Eulalia.*
9. Culms straggling; blades lanceolate with short petioles; first glume with usually a distinct dorsal groove.....29. *Microstegium.*
8. Racemes solitary; spikelets 2-awned, the awns similar.....30. *Pogonatherum.*
3. Sessile spikelets staminate; pediceled spikelets perfect, long awned.....31. *Sclerandrium.*
2. Spikelets not all fertile, usually differing also in size, shape and awns; sessile spikelet fertile, the pediceled staminate or neuter, often much reduced, sometimes completely wanting, only the pedicel remaining (if spikelets similar then the rachis joints and pedicels thickened).
10. Rachis joints and pedicels thickened, either trigonous, rounded, or flattened (sometimes the pedicel more or less reduced).
11. Racemes reduced to a single joint of three spikelets, each raceme partly enclosed in a swollen bract or spathe, these solitary at the ends of the panicle branches.....33. *Apluda.*
11. Racemes not as above, several- to many-jointed.
12. Rachis joints and pedicels trigonous, not at all flattened or hollowed out on the side next to the sessile spikelet; fertile lemma usually awned.....32. *Ischaemum.*
12. Rachis joints and pedicels flattened, rounded or hollowed out on the side next to the sessile spikelet; fertile lemma awnless.
13. First glume of sessile spikelet subhemispheric, foveolate, the margins clasping the edges of the fused rachis joint and pedicel.....34. *Hackelochloa.*
13. First glume of sessile spikelet dorsally flattened or slightly convex.
14. Sessile spikelets not deeply sunken in the cavities of the rachis joints; first glume pectinate or with stiff setae on the keels.
15. First glume with a line of balsam glands just inside the keels, the apex bearing two long flattened aristate teeth about as long as the body; pediceled spikelets present.....37. *Elyonurus.*
15. First glume without such glands, obtuse; pediceled spikelets wanting, the pedicels glume-like or stipe-like.....36. *Eremochloa.*
14. Sessile spikelets more or less deeply sunken in the cavities of the rachis joints; first glume smooth on the keel, not pectinate.
16. Pediceled spikelets present.
17. Pediceled and sessile spikelets similar; rachis tenacious, disarticulating very tardily.....35. *Hemarthria.*
17. Pediceled and sessile spikelets dissimilar; rachis fragile, disarticulating readily.....38. *Rottboellia.*
16. Pediceled spikelets wanting, the pedicels firmly fused to the rachis joints.
18. Spikelets all borne on one side of the rachis; first glumes asymmetrical, the apices pointing in alternate directions.....39. *Thaumastochloa.*
18. Spikelets borne alternately on either side of the rachis; first glume symmetrical.....40. *Ophiuros.*
10. Rachis joints and pedicels slender (sometimes somewhat thickened upward); fertile spikelet usually awned.
19. Fertile spikelets disarticulating horizontally, the callus short, blunt.

20. Blades cordate; awn of fertile lemma arising from the base.....43. *Arthraxon.*
20. Blades not cordate; awn of fertile lemma, if present, arising from the tip or from between the teeth of a bifid apex.
21. Racemes in pairs, one sessile, the other peduncled, included in an inflated spathe, these aggregated into a large compound inflorescence; lowest pair of spikelets in one or both racemes homogamous.....45. *Cymbopogon.*
21. Inflorescence not as above.
22. Glumes firmly indurate, smooth and shining.....41. *Sorghum.*
22. Glumes membranous-coriaceous, often more or less prominently nerved.....44. *Andropogon.*
19. Fertile spikelets disarticulating obliquely, the callus pungent-pointed.
23. Racemes without pairs of homogamous spikelets at base.....42. *Chrysopogon.*
23. Racemes with 1 or more pairs of homogamous spikelets at base, these staminate or neuter.
24. Racemes capitate, solitary, long-exserted.....48. *Germainia.*
24. Racemes not as above.
25. Fertile spikelets dorsally flat or grooved; first glume chartaceous.....46. *Hyparrhenia.*
25. Fertile spikelets terete; first glume coriaceous.
26. Homogamous pairs of spikelets 2, approximate and forming a sort of involucre at base of the 1–3-jointed raceme; inflorescence a large spatheate panicle.....47. *Themeda.*
26. Homogamous pairs of spikelets 1 to many at base of the several to many-jointed raceme; inflorescence a solitary spikelike raceme terminating the culms and branches; sterile spikelets obliquely lanceolate, imbricate and obscuring the fertile spikelets.....49. *Heteropogon.*

23. Dimeria R. Br.

Dimeria R. Br., Prodr. Fl. Nov. Holl. 1: 204. 1810.
Haplachne Presl, Rel. Haenk. 1: 234. *pl. 38.* 1830.
Woodrowia Stapf, Hook. Ic. 25: *pl. 2447.* 1896.

Spikelets strongly laterally compressed, short-pediceled, solitary in two rows on one side of a trigonous or flattened continuous rachis; glumes keeled, often winged, only slightly indurate, the margins usually hyaline; first glume usually narrower and slightly shorter than the second; lemmas hyaline, the sterile shorter, awnless, the fertile rarely awnless, usually awned from the bifid apex, the awn geniculate, the basal segment brown and twisted; stamens 2. Annuals or perennials with usually slender culms and digitate or approximate, sometimes solitary, racemes.

TYPE SPECIES: *Dimeria acinaciformis* R. Br.

KEY TO THE SPECIES

1. Spikelets 3.5–5 mm. long.
2. Racemes solitary.....1. *D. monostachya.*
2. Racemes 2 to 5.
3. Both glumes prominently winged on the keel; rachis 1 mm. wide, densely ciliate on the margins.....2. *D. dipteros.*
3. First glume not winged; rachis about 0.8 mm. wide, scabrous or only sparsely ciliate on the margins.....3. *D. ciliata.*

1. Spikelets 2–2.5 mm. long.
   4. Second glume not winged on the keel; fertile floret awned, the awn geniculate. . . . . 4. *D. ornithopoda.*
   4. Second glume winged on the keel; fertile floret awnless or with a reduced straight awn. . . . . 5. *D. glabriuscula.*

1. **Dimeria monostachya** sp. nov. PLATE V, *Figs. a, b.*

Annua 25–45 cm. alta; culmis filiformibus, erectis, glabris; nodis breviter barbatis, circiter 7; vaginis carinatis, pilosis, pilis circiter 1 mm. longis; ligula membranacea, circiter 0.5 mm. longa; laminis planis vel conduplicatis, erectis, 2–3 mm. latis, inferioribus 4–8 cm. longis, ad apicem culmis brevioribus, marginibus plus minusve revolutis, utrinque pilosis, pilis quam eis vaginae paullo longioribus; racemo solitario, 5–7 cm. longo, floribus confertis; rhachi circiter 0.8 mm. lata, complanata, dorso leviter rotundato, marginibus dense ciliatis; pedicellis complanatis, circiter 0.2 mm. longis; spiculis imbricatis, 3.5–4 mm. longis; glumis dense albopilosis, carinis longe ciliatis; gluma prima acuta, quam gluma secunda paullo breviore, carina haud alata; gluma secunda acuminata, quam gluma prima duplo latiore, carina tota longitudine late alata, margine ciliato, ceterum glabra; lemmate sterili quam fertili paullo breviore; lemmate fertili quam spicula circiter quarta parte breviore, arista circiter 8 mm. longa, columna 1–1.5 mm. longa; antheris circiter 0.8 mm. longis.

BRITISH NEW GUINEA: Western Division: Lake Daviumbu, Middle Fly River, *Brass 7806* (A, TYPE, US), September, 1936 (gregarious on wetter savannahs).

Closely related to *Dimeria sinensis* Rendle, but differing in having larger spikelets in which the second glume is acuminate rather than obtuse, and in the shorter awn in which the column is 1–1.5 mm. long rather than 3–4 mm. as in *D. sinensis.* The habit suggests *D. pusilla* Thwaites, but that species is smaller and has larger spikelets in which the glumes are aristate.

The above specimen was reported as *Dimeria falcata* Hack. by Chase (17, p. 313).

2. **Dimeria dipteros** sp. nov. PLATE VI.

Annua 30–80 cm. alta; culmis glabris, simplicibus, erectis vel adscendentibus; nodis barbatis, pilis adscendentibus circiter 2 mm. longis; vaginis carinatis, dense pilosis, quam internodiis longioribus; ligula membranacea, ciliolata, circiter 0.6 mm. longa; laminis erectis, planis, 5–12 cm. longis, 3–5 mm. latis (summa valde redacta) dense pilosis; racemis binatis vel ternatis, 5–8 cm. longis; rhachi circiter 1 mm. lata, anguste alata, alis dense rigido-ciliatis, pilis 0.5–1 mm. longis, ceterum glabra; pedicellis complanatis, circiter 0.5 mm. longis, marginibus apicem versus rigido-ciliatis, pilis quam pedicellis paullo longioribus; spiculis plus minusve pubescentibus, anguste obovatis, callo breve barbato; glumis subaequalibus, acutis, carinis late alatis, marginibus ciliatis, pilis apicem versus brevioribus; gluma prima 4–4.5 mm. longa, carina quam corpo glumae plerumque paullo latiore; gluma secunda 4.5–5 mm. longa, 1.5 mm. lata, carina circiter 0.5 mm. lata, apicem versus paullo latiore; lemmate sterili scariosa, ciliata, 2.5–3 mm. longa; lemmate fertili 3.5–4 mm. longa, aristata; arista 8–10 mm. longa, e apicem lemmatis bifida, columna 1.5–2 mm. longa; antheris 1.5 mm. longis.

BRITISH NEW GUINEA: Central Division: Urunu, Vanapa Valley, alt. 1900 m., *Brass 4802* (GH, US) (a few plants among sedges in small swampy hollows on

grassland). NETHERLANDS NEW GUINEA: Balim River, alt. 1800 m., *Brass 11738* (A, US, TYPE), Dec. 1938 (common on sandy, long deforested slopes).

Related to *Dimeria bialata* C. E. C. Fisch. but that species is much smaller and has much shorter racemes, slightly smaller more glabrous spikelets, anthers 1 mm. long, and an awn with the column about 3 mm. long.

Comparison may also be made with *Dimeria chloridiformis* (Gaudich.) K. Schum. & Lauterb., but that species has somewhat longer leaves, culms which are pubescent below the inflorescence, racemes in 4's or 5's, and the common axis pubescent rather than glabrous. The greatest difference, however, is seen in the spikelets, in which the first glume is apiculate and wingless, the second acuminate and with only a very small wing just below the tip. The anthers are 1.8 mm. long.

Brass 4802 was reported as *Dimeria chloridiformis* by Hitchcock (35, p. 124).

3. **Dimeria ciliata** Merr., Philip. Jour. Sci. Bot. 9: 262. 1914. Type from the Philippines.

Perennial; culms slender, tufted, more or less pubescent, 50–85 cm. tall; nodes bearded, the hairs stiffly ascending, 1–1.5 mm. long; sheaths slightly shorter than the internodes, more or less pilose, keeled, at least above; ligule about 0.8 mm. long, membranous, often ciliate; blades more or less densely pilose, 8–25 cm. long, 3–5 mm. wide; inflorescence long-exserted, of 3–6 racemes, the common axis about 1 mm. long; racemes 7–13 cm. long, the rachis trigonous, about 0.8 mm. wide, glabrous or slightly ciliate on the margin, sometimes slightly pubescent on the back; pedicels 0.8–1 mm. long, rather stout, ciliate on the outer margins; spikelets 4–4.5 mm. long, the glumes prominently ciliate with long white hairs on the keels; the first glume slightly shorter and narrower than the second, not winged; second glume with a prominent wing on the keel toward the apex, the lower half wingless; sterile lemma about 3 mm. long, ciliate; fertile lemma about 3.5 mm. long, the awn about 10 mm. long; anthers about 1 mm. long.

BRITISH NEW GUINEA: Western Division: Dagwa, Oriomo River, alt. about 40 m., *Brass 5911* (A, US, NY) (scattered in small, spreading tufts on damp ridge slopes).

Philippines, New Guinea.

Related to *Dimeria chloridiformis* (Gaudich.) K. Schum. & Lauterb., from the Marianas, but differing in the smaller spikelets, less pubescent foliage, and narrower rachises, which are not densely ciliate.

Brass 5911 was reported as *Eulalia argentea* Brongn. var. *queenslandica* (Domin) Hitchc. by Hitchcock (35, p. 126). The combination which he makes there is a valid one but does not apply to the New Guinea plants.

3a. **Dimeria ciliata** Merr. var. **heteromorpha** var. nov.

A typo differt culmis vaginisque glabris, laminis glabris vel marginibus plus minusve pilosis basi tuberculatis, ala glumae secundae interdum ad basin imam extendit.

BRITISH NEW GUINEA: Western Division: Lake Daviumbu, Middle Fly River, *Brass 7807* (A, TYPE, US), Sept. 1936 (gregarious in small patches on wet savannahs), *Brass 7932* (A, US) (plentiful on moist savannah slopes).

Differs from the species in having glabrous culms and sheaths, the blades glabrous or with the margins more or less tuberculate-pilose, and the wing of the second legume sometimes extending all the way to the base. The varietal epithet refers to the variable nature of the spikelets. Within the same inflorescence, in some spikelets the second glumes are winged only at the apex as in typical *Dimeria ciliata*, in others the wings extend entirely to the base, and there are numerous intergradations.

4. **Dimeria ornithopoda** Trin., Fund. Agrost. 167. *fig. 14.* 1820; C. T. White, Proc. Roy. Soc. Queensl. 34: 14. 1923. Type from India.

Annual; culms glabrous, slender, tufted, 15–30 cm. tall (rarely taller), the nodes bearded; sheaths mostly shorter than the internodes, keeled, glabrous to papillose-pilose; ligule about 0.5 mm. long; blades erect, as much as 6 cm. long, 2–3 mm. wide, glabrous or papillose-pilose; racemes binate or ternate, 2–5 cm. long, the rachis undulate, trigonous, about 0.3 mm. wide or less, the margins scabrous; pedicels very short; spikelets 2–2.5 mm. long, the callus short-bearded; glumes subequal, acute, scabrous or somewhat pubescent, the keels not winged; fertile lemma slightly shorter than the first glume and bearing a geniculate awn, the column of which is about as long as the spikelet; anthers about 0.5 mm. long.

Widely distributed in the tropics and subtropics of the Old World.

No specimens of this species were seen from New Guinea — the description was drawn up from Philippine and Australian specimens. Included here since it was reported by White, and it seems probable that it occurs in New Guinea.

5. **Dimeria glabriuscula** F. M. Bailey, Syn. Queensl. Fl. Suppl. 3: 83. 1890. Type from Australia.

Dimeria glabra Ridley, Fl. Malay Penin. 5: 192. 1925; Hitchc., Brittonia 2: 125. 1936. Type from Singapore.

Annual; culms glabrous, erect, tufted, very slender, 20–50 cm. tall, the nodes minutely bearded; sheaths keeled, glabrous or slightly ciliate on the margins; ligule about 0.5 mm. long; blades 2–6 cm. long, 2–3 mm. wide, glabrous or slightly pubescent; racemes binate or ternate, 3–6 cm. long, the trigonous rachis about 0.4 mm. wide, undulate, the margins scabrous; pedicels very short; spikelets 2–2.5 mm. long, the callus not bearded; glumes subequal, acute, the first narrow, scabrous, the second about twice as wide as the first, scabrous or rarely slightly puberulent, the keel with a narrow wing extending quite or nearly to the base; fertile lemma slightly shorter than the first glume, awnless or with a short straight awn (rarely a few of the spikelets with a geniculate awn); anthers about 0.5 mm. long.

BRITISH NEW GUINEA: Western Division: Dagwa, Oriomo River, alt. 40 m., *Brass 5984* (GH, US) (in small patches or colonies on damp grass slopes); Lake Daviumbu, Middle Fly River, *Brass 7850* (A, US) (rare grass, gregarious on wet savannahs).

Singapore, Netherlands Indies, the Philippines, New Guinea to Australia.

Closely related to *Dimeria ornithopoda* but differing in being more nearly glabrous and in having a more erect habit. Further differences are seen in the spikelets, which are not bearded on the callus, have the second glume winged on the keel, and the fertile lemma awnless or with a reduced straight awn.

24. Imperata Cyrillo

Imperata Cyrillo, Pl. Rar. Neap. 2: 26. *pl. 11*. 1792.

Spikelets more or less dorsally compressed, all alike and perfect, usually in pairs (rarely solitary), unequally pediceled, along a slender continuous rachis, surrounded by long silky hairs from the base and lower part of the glumes; glumes about equal, membranous; lemmas hyaline, awnless, shorter than the glumes; styles 2; stamens 1 or 2. Perennials with stout creeping rhizomes and more or less spikelike, conspicuously silky panicles.

TYPE SPECIES: *Imperata arundinacea* Cyrillo = *I. cylindrica* (L.) Beauv. (*Lagurus cylindricus* L.).

KEY TO THE SPECIES

1. Stamens 2; panicle dense, spikelike.....1. *I. cylindrica.*
1. Stamen 1; panicle somewhat open (rather dense in high altitude form).....2. *I. exaltata.*

1. **Imperata cylindrica** (L.) Beauv., Ess. Agrost. 165, 177, *pl. 5, fig. 1*. 1812; Hitchc., Brittonia 2: 125. 1936; Pilger, Nat. Pflanzenfam. ed. 2. 14e: 111. *fig. 64*. 1940.

Lagurus cylindricus L., Syst. Nat. ed. 10. 2: 878. 1759. No locality given.
Imperata arundinacea Cyrillo, Pl. Rar. Neap. 2: 27. *pl. 11*. 1792; F. Muell., Vict. Nat. 1: 168. 1844; Hack. in DC., Monogr. Phan. 6: 92. 1889. Type from Italy.

1a. **Imperata cylindrica** (L.) Beauv. var. **major** (Nees) C. E. Hubb. in C. E. Hubb. & Vaughan, Grass. Maurit. and Rodriguez 96. 1940.

Saccharum Koenigii Retz., Obs. Bot. 5: 16. 1789. Type from Japan.
Imperata Koenigii (Retz.) Beauv., Ess. Agrost. 165. 1812.
Saccharum confertum Presl, Rel. Haenk. 1: 346. 1830. Type from the Philippines.
Imperata Koenigii (Retz.) Beauv. var. *major* Nees, Fl. Afr. Austr. 90. 1841. Type from Africa.
Imperata arundinacea Cyrillo var. *Koenigii* (Retz.) Benth., Fl. Hongk. 419. 1861; Hack., Bot. Jahrb. 6: 238. 1855, in DC., Monogr. Phan. 6: 94. 1889.
Imperata cylindrica (L.) Beauv. subvar. *Koenigii* (Retz.) Durand & Schinz, Consp. Fl. Afr. 5: 694. 1894.
Imperata cylindrica (L.) Beauv. var. *Koenigii* (Retz.) Pilger in Perk., Fragm. Fl. Philip. 137. 1904; Hack., Denkschr. Akad. Wiss. Math.-Naturw. (Wien) 89: 492. 1913.
Imperata conferta (Presl) Ohwi, Bot. Mag. (Tokyo) 55: 549. 1941.

Culms erect, simple, slender to moderately stout, 40–120 cm. tall, mostly 1- to 3-noded, the nodes bearded; sheaths overlapping, keeled, glabrous or slightly pubescent; ligule truncate, 0.5–1 mm. long; blades linear-lanceolate, broadest at the middle and tapering to either end, flat, very variable in length, 10–50 cm. or more long, 5–15 mm. wide, glabrous or hairy at the base, scabrous on the margins; panicle usually densely cylindric, sometimes slightly branching at the base, 5–22 cm. long; spikelets 3–4 mm. long, the hairs about 10 mm. long; glumes subequal, membranous, 3–7-nerved; anthers 2, borne on long slender filaments.

BRITISH NEW GUINEA: Western Division: Gaima, Lower Fly River, *Brass 8296* (A, US) (covering old clearings in both savannah and rain-forest). NORTHEAST NEW GUINEA: Morobe District: Near Kajabit Mission, alt. about 200 m., *Clemens 10668b* (US); in the Ramu Valley near the headwaters of the Markham River, *Rogers 3001* (A); four miles south of Langemak Bay, *Sawyer 81* (A); near Yabim, *H. Zahn* in 1903 (US).

East Africa, Indo-Malayan region, New Guinea to Australia. Also Japan.

Imperata cylindrica is an extremely variable and wide-ranging species, and hence it has a large number of synonyms. C. E. Hubbard (Imp. Agric. Bur. Joint Publ. 7:5–13. *1 map*. 1944) recognizes five varieties, one of which occurs in South America and the rest in the Old World. Variety *major*, to which our plants appear to belong, has a greater range than the others and probably a greater variability. According to Hubbard, each of the varieties has a rather definite geographic distribution.

2. **Imperata exaltata** Brongn. in Duperry, Bot. Voy. Coquille 2(2): 101. 1831; Hack. in DC., Monogr. Phan. 6: 98. 1889; K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 165. 1901; Hitchc., Brittonia 2: 125. 1936. Type from Waigiou Island.

Saccharum macilentum Chauvin ex Steud., Syn. Pl. Glum. 1: 406. 1854; F. Muell., Pap. Pl. 1: 47. 1876. Type from Waigiou Island.

Culms 60–150 cm. tall (rarely only 25 cm. in subsp. *Merrillii*), slender in proportion to their height, 3–4-noded, the nodes not bearded; sheaths overlapping, more or less keeled; ligule truncate, shortly ciliate, 0.5–1.5 mm. long; blades lanceolate-linear or rarely linear, flat or sometimes involute, 25–80 cm. long, 6–20 mm. wide, the base attenuate and distinctly canaliculate at the junction of the sheaths, glabrous or pilose only at the base, the margins scabrous; panicle as much as 40 cm. long, 3–7 cm. wide, with numerous short rather lax branches especially toward the base; spikelets 2.5–3 mm. long, the hairs 2 to 3 times as long; glumes subequal, 3-nerved; stamen 1, 2–2.5 mm. long.

BRITISH NEW GUINEA: Islands near the southeast end, *Armit 55* (US); Central Division: Urunu, Vanapa Valley, *Brass 4813* (A, US) (common on paths through old garden lands); Kanosia, *Carr 11244* (NY) (on open savannah land); Western Division: Junction of the Black and Palmer Rivers, *Brass 6945* (A, US) (forming dense pure stands on a gravel island in the Palmer River); Northern Division: About 9 miles northwest of Oro Bay, *Reeder 813* (A, US) (bank of creek in partial shade). NORTHEAST NEW GUINEA: Morobe District: Huon Gulf, *Herre 231* (NY). NETHERLANDS NEW GUINEA: Nassau region, Explorat Biv., alt. about 700 m., *Docters van Leeuwen 10500* (GH). NEW BRITAIN: *Parkinson 65* (US).

Southeastern Asia to New Guinea.

2a. **Imperata exaltata** Brongn. subsp. **Merrillii** Hack., Philip. Jour. Sci. 1: Suppl. 264. 1906. Type from the Philippines.

Differs from the typical form in having narrower blades and a shorter, denser panicle. The spikelets seem to be identical and have only one stamen as in the species.

BRITISH NEW GUINEA: Central Division: Wharton Range, Murray Pass, alt. 2840 m., *Brass 4721* (A, US) (common on hillsides and in open country). NETHERLANDS NEW GUINEA: Northern slopes of Mount Wilhelmina, Wemena River, alt. 3200 m., *Brass & Meyer-Drees 10235* (A, US) (covering beaches of gravel and sand); 9 km. northeast of Lake Habbema, alt. 2600 m., *Brass 10902* (A, US) (on old landslip in forest); Bele River, 18 km. northeast of Lake Habbema, alt. 2200 m., *Brass 11491* (A, US) (dominant grass on old garden lands).

Philippines and New Guinea.

The cited specimens look superficially like *Imperata cylindrica* and were cited under this name by Chase (24, p. 88). They differ in having slightly smaller spikelets with only one stamen. This is apparently a

high altitude form of *I. exaltata* and perhaps not worthy of subspecific status.

25. Miscanthus Anderss.

Miscanthus Anderss., Oefv. Svensk. Vet. Akad. Foerhandl. Stockh. 1855: 165. 1856.
Eulalia Trin., Mém. Acad. St. Pétersb. VI. 2: 332. 1832 (non Kunth, 1829).
Xiphagrostis Coville, Contr. U. S. Nat. Herb. 9: 399. *pl. 69*. 1905.

Spikelets all alike and perfect, in pairs, unequally pediceled on a continuous rachis, the callus villous; glumes subequal, chartaceo-membranous; lemma hyaline, the fertile bifid and awned or rarely awnless, the awn twisted, straight or slightly geniculate. Tall perennials with long flat or convolute blades and large open terminal panicles of several to many racemes.

TYPE SPECIES: *Miscanthus japonicus* Anderss. = *M. floridulus* (Labill.) Warb. (*Saccharum floridulum* Labill.).

1. **Miscanthus floridulus** (Labill.) Warb. in K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 166. 1901; C. T. White, Proc. Roy. Soc. Queensl. 34: 15. 1923.
Saccharum floridulum Labill., Sert. Austro. Caled. 13. *pl. 18*. 1824. Type presumably from New Caledonia.
Miscanthus japonicus Anderss., Oefv. Svensk. Vet. Akad. Foerhandl. Stockh. 1855: 166. 1856; Warb., Bot. Jahrb. 16: 13. 1892; Hitchc., Proc. Linn. Soc. N. S. Wales 54: 145. 1929 (non *Saccharum japonicum* Thunb. 1794). Type from Japan.

Culms in large clumps, erect, robust, 1.5–4 meters tall; sheaths overlapping, glabrous, not keeled; ligule membranous, about 1 mm. long, often ciliate; blades 25–80 cm. long, 10–30 mm. wide, rather firm, the margins serrulate-scabrous; panicle broad, flabellate, 15–40 cm. long, the central axis about two-thirds as long; lower branches 15–20 cm. long, the rachis glabrous or sometimes pilose; spikelets 3–5 mm. long, the soft spreading callus hairs about as long; awn about 3–8 mm. long.

BRITISH NEW GUINEA: Gulf Division: Ihu, Vailala River, *Brass 920* (GH, US) (in large thickets on the river banks); Central Division: Wharton Range, Murray Pass, alt. 2800 m., *Brass 4191* (A, US) (large tussock grass scattered on open slopes), *Brass 4528* (GH, US) (rare; sporadic on open grasslands), *Brass 4723* (US) (rare; in large clumps on open country); Urunu, Vanapa Valley, alt. 1900 m., *Brass 4778* (GH, US) (covers large areas of old garden land on deforested valley slopes. NORTHEAST NEW GUINEA: Morobe District: Sattelberg, Ogeramnang, alt. about 1800 m., *Clemens 4454* (A); Sarawaket, alt. about 2500 m., *Clemens 6145* (A). NETHERLANDS NEW GUINEA: Bele River, 18 km. northeast of Lake Habbema, alt. 2200 m., *Brass 11584* (forming occasional thickets in open second growths); Balim River, alt. 1600 m., *Brass 11809* (A, US) (a few clumps on river bank).

Eastern Asia to Polynesia.

26. Saccharum L.

Saccharum L., Sp. Pl. 54. 1753; Gen. Pl. ed. 5. 28. 1754.

Spikelets all alike and perfect, awnless, in pairs, one sessile, the other pediceled on an articulate fragile rachis, this disarticulating below the spikelets; glumes equal, somewhat indurate, often more firm below, the first usually 2–4-nerved (rarely with a midnerve), the second 1–5-nerved; sterile lemma hyaline, about as long as the glumes; fertile lemma much reduced or wanting. Tall perennials with large silky terminal panicles.

TYPE SPECIES: *Saccharum officinarum* L.

1. **Saccharum spontaneum** L., Mant. 2: 183. 1771; F. Muell., Pap. Pl. 1: 46. 1879; Hack., Bot. Jahrb. 6: 238. 1885, in DC., Monogr. Phan. 6: 113. 1889. Type from India.

Imperata spontanea (L.) Beauv. ex Roem. & Schult., Syst. 2: 289. 1817.

Saccharum robustum Brandes & Jeswiet ex Grassl, Jour. Arnold Arb. 27: 234. 1946. Type from New Guinea.

Culms in dense tufts or clumps, 2–10 meters tall, slender and more or less woody at base to robust and pithy, erect or somewhat decumbent at base; sheaths longer than the internodes, sparsely to densely pubescent, the hairs usually more dense near the margins; ligule membranous, short ciliate, 1.5–4 mm. long; blades long-linear, 1–5 (rarely 7) cm. wide, the margins serrulate-scabrous; panicle 20–90 cm. long, the fragile branches suberect or spreading; rachis long-pilose or only scabrous; spikelets 3–5.5 mm. long, the glumes usually more or less firmly indurate and often reddish on the lower half, the upper margins ciliate; sterile lemma well developed, about as long as the glumes; fertile lemma very much reduced or completely wanting.

BRITISH NEW GUINEA: Central Division: Rona, Laloki River, alt. 450 m., *Brass 3628* (A, US) (on roadsides in savannahs, not common); near Port Moresby, Rauna Falls, *Jeswiet* in 1928 (US); Kanosia, *Carr 11129* (NY) (open savannah land); banks of the Laloki River, about 27 km. from Port Moresby, *Jeswiet* in June, 1928 (US) (type of *S. robustum*); Northern Division: Near Dobodura, on banks of Samboga River, *Reeder 828* (A, US) (on gravelly soil; culms 3–4 meters tall); Western Division: Palmer River, *Brass 6957* (A) (stands 3–4 meters high on gravel banks of the river). NORTHEAST NEW GUINEA: Morobe District: *Clemens 6558* (A); Wareo, alt. 625 m., *Clemens 1410* (A); Ongerman [sic], on the Sepik River, *Herre 284* (NY) (on river banks; plants 10–20 feet high; covers tens of thousands of acres extending along the Sepik River for over 500 m. from the sea and beyond for an unknown distance). NETHERLANDS NEW GUINEA: Near Hollandia, *Brass 8920* (A) (forming small thickets 2–3 meters high along the river); 18 km. northeast of Lake Habbema, Bele River, alt. 2200 m., *Brass 11374* (A, US) (very abundant in tall thickets on abandoned garden land, 2.5–3 meters high); Balim River, alt. 1600 m., *Brass 11778* (A, US) (abundant on alluvial soil of river banks; gregarious in clumps about 2 meters high); 4 km. southwest of Bernhard Camp, Idenburg River, alt. 850 m., *Brass 13264* (A, US) (colonizing sand and gravel beaches in river; thickets up to 8 meters high); Bernhard Camp, Idenburg River, alt. 50 m., *Brass 13791* (A, US) (in dense pure stands 7–8 meters high on recent silt deposits of the river banks).

Widely distributed from the Indo-Malayan region to New Guinea and adjacent islands.

Saccharum robustum Brandes & Jeswiet ex Grassl is here treated as a synonym, since the distinctions given by Grassl as separating it from *S. spontaneum* do not seem to hold. In the discussion following the original description one reads that *S. robustum* is "distinguished readily" by the reduced third glume [fertile lemma], the sparser and shorter hairs on the rachis and callus, the smaller spikelets, and the much larger size of the plants themselves. Examination of available specimens shows that these distinctions have little basis in fact. The fertile lemma is reduced in all the cited specimens, although the degree of reduction varies in different plants and even in different spikelets in the same panicle. Grassl implies that the large, robust plants (*S. robustum*) have small spikelets, while in the smaller plants (*S. spontaneum*) the spikelets are larger. *Carr 11129*

is a small plant with a slender, woody culm, yet the spikelets are only about 3 mm. long. *Brass 6957* has rather robust culms, broad blades, and small spikelets, yet on the label the height of the plant is given as "3–4 m." *Brass 11374* has the broad blades and robust culms of *S. robustum*, yet the spikelets are 5–5.5 mm. long, and the height of the plants is given as only 2.5–3 meters. There seems also to be little correlation between the size of the spikelets and the length of the hairs on the rachis and callus. In view of the difficulty, if not impossibility, of separating coherent groups from the New Guinea material, it seems advisable to consider it as one polymorphic species pending further detailed collecting and field study.

2. **Saccharum officinarum** L., Sp. Pl. 54. 1753; Hack. Bot. Jahrb. **13**: 263. 1890; Pilger, Nat. Pflanzenfam. ed. 2. **14e**: 114–116. *fig. 66*. 1940. Type from India.
Saccharum sinense Roxb., Fl. Ind. **1**: 244. 1820; Ohwi, Bot. Mag. (Tokyo) **56**: 9. 1942. Described from specimens in Botanical Garden introduced from China.

This is the cultivated sugar cane. It is widely distributed and cultivated by natives throughout the Island and is spontaneous in old garden lands. The culms are 2–6 meters tall and 2–4 cm. in diameter. The lower internodes are often very short and stout. No herbarium specimens of this species from New Guinea have been seen. Living plants were observed in native gardens on numerous occasions while the writer was there in 1943–44. Unfortunately no specimens were collected.

3. **Saccharum edule** Hassk., Flora 25: Beibl. 3. 1842. Type from Java.
Saccharum spontaneum L. var. *edulis* (Hassk.) K. Schum. in K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 166. 1901.

In this species the inflorescence fails to develop normally and remains permanently enclosed within the sheaths of the upper leaves. This abortive inflorescence is roasted and eaten as a vegetable by the natives. Since it produces no flowers, the plant can be propagated only by vegetative means. Grassl (Jour. Arnold Arb. **27**: 240–242. 1946) discusses the relationship of this horticultural species with other species of *Saccharum*. He also (op. cit. *pl. 2, fig. 1, 2*) figures the abortive inflorescence. The species is apparently cultivated throughout the island. As seen growing, it resembles *S. officinarum*, but the culms are dry and do not contain sweet juice. Hackel (24, p. 263) doubtfully reports *S. edule* from New Guinea.

No specimens of this species were available to the writer, but living plants were observed in a native garden in British New Guinea in 1943. As in the case of the former species, no specimens were collected.

27. **Erianthus** Michx.

Erianthus Michx., Fl. Bor. Amer. 1: 54. 1803.

Spikelets all alike and perfect, awned or awn-pointed, in pairs along a slender rachis, one sessile, the other pediceled, the rachis disarticulating below the spikelets, the rachis joint and pedicel falling attached to the sessile spikelet; glumes coriaceous, equal, usually clothed with long spread-

ing silky hairs; sterile lemma hyaline, empty; fertile lemma hyaline, the midnerve extending into a prominent awn or the lemma at least awn-pointed. Perennials with dense terminal silky panicles.

TYPE SPECIES: *Erianthus saccharoides* Michx. = *E. giganteus* (Walt.) Muhl. (*Anthoxanthum giganteum* Walt.).

KEY TO THE SPECIES

1. Fertile lemma mucronate or the awn only about 1 mm. long; panicle 25–60 cm. long.....1. *E. arundinaceus.*
1. Fertile lemma with an awn as long as the spikelet or longer; panicles about 15 cm. long.....2. *E. fastigiatus.*

1. **Erianthus arundinaceus** (Retz.) Jesw., Arch. Suikerind Nederland Indië Meded. 33: 399. 1925; Pilger, Nat. Pflanzenfam. ed. 2. 14e: 118. 1940.
Saccharum arundinaceum Retz., Obs. Bot. 4: 14. 1786; Hack. in DC., Monogr. Phan. 6: 117. 1889; Ridley, Trans. Linn. Soc. II. (Bot.) 9: 249. 1916. Type from India.

Culms robust, 2–5 (sometimes to 7) meters tall, 1–2 cm. in diameter; sheaths longer than the internodes, glabrous, often pruinose; ligule membranous, ciliate, 1–2 mm. long; blades flat, linear, 30–150 cm. long, 10–70 mm. wide, glabrous, smooth, the margins serrulate-scabrous; panicle large, plume-like, 25–60 cm. long, the branches ascending or somewhat spreading; spikelets 3.5–4 mm. long, the callus short-bearded; glumes acuminate, the dorsal surface clothed with long spreading hairs or the second glume sometimes glabrous or nearly so; sterile lemma about equaling the glumes; fertile lemma slightly shorter, the midnerve extending into a short mucro or an awn as much as 1 mm. long; fertile palea about half as long as the lemma.

BRITISH NEW GUINEA: Western Division: Fly River, about 30 miles below Everill Junction, *Brass 6582* (A, US) (in pure stands, 3–5 meters high; occupies many miles of the swampy banks of the middle river); Strickland River, *W. Bauerlen 60* (US).

Indo-Malayan Region to New Guinea.

2. **Erianthus fastigiatus** (Nees ex Steud.) Hack. in DC., Monogr. Phan. 6: 150. 1889.
Saccharum fastigiatum Nees ex Steud., Syn. Pl. Glum. 1: 409. 1855. Type from India.
Erianthus sesquimetralis Ohwi, Bot. Mag. (Tokyo) 56: 9. 1942. Type from Netherlands New Guinea.

Culms subrobust, 150 cm. or more tall, appressed-pilose at the summit, otherwise glabrous; sheaths 20–30 cm. long, appressed-pilose on the margins near the summit, otherwise glabrous; ligule truncate, minutely ciliate, about 0.7 mm. long; blades elongate, 30–80 cm. long, 5–8 mm. wide, rigid, glabrous except for a few hairs at the base; panicle short-exserted, erect, about 15 cm. long, 3–4 cm. wide, the axis clothed with long white hairs; racemes solitary, the lower about 4 cm. long, the rachis pilose with white spreading hairs, the joints about one-third shorter than the spikelets; pedicels rather slender and pilose like the rachis; spikelets lanceolate, about 4 mm. long; glumes acute, reddish brown except for the pale apex; first glume minutely bimucronate, flattened, the lower half near the margins bearing long white hairs; second glume 1-nerved, the lower part of the keel short-pilose; sterile lemma nerveless, slightly shorter than

the glumes, somewhat brownish below, the margins and scarious apex ciliate; fertile lemma about 1.5 mm. long, bidentate and bearing a brownish awn about 7–8 mm. long; palea about half as long as the lemma.

NETHERLANDS NEW GUINEA: Momi, 60 miles south of Manokwari, *Kanehira & Hatusima 13291* (type of *E. sesquimetralis* Ohwi) (fragment at A) (in waste plantation 10 m. above the sea).

The type of *Erianthus fastigiatus* has not been seen, but from the brief description in Steudel, and Hackel's detailed diagnosis, *E. sesquimetralis* seems referable to this species. A fragmentary specimen in the U. S. National Herbarium, from India, which seems to represent this species, has spikelets which are almost identical with those of the New Guinea plant except that the hairs on the first glume are slightly shorter.

28. Eulalia Kunth

Eulalia Kunth, Rev. Gram. 1: 160. 1829.

Pollinia Trin. sect. *Eulalia* (Kunth) Benth. & Hook., Gen. Pl. 3: 1127. 1883.

Pollinia Trin. subgen. *Eulalia* (Kunth) Hack. in DC., Monogr. Phan. 6: 152. 1889.

Spikelets paired, all alike and perfect, one pediceled and falling free from the pedicel, the other sessile and falling with the rachis joint and the pedicel of the upper spikelet (rarely both pediceled and disarticulating obliquely, forming a sharp-pointed callus, the pedicels remaining attached to the tardily disarticulating rachis joints); glumes subequal, the first dorsally flattened or rounded, sometimes slightly grooved, the second more or less keeled on the back, 1–3-nerved, sometimes awned; sterile lemma hyaline, as long as the glumes, reduced, or sometimes wanting; fertile lemma minute, usually reduced to the delicate base of a stout twisted and geniculate awn. Perennials or rarely annuals with usually erect culms, linear blades, and digitate or approximate racemes.

TYPE SPECIES: *Eulalia aurea* (Bory) Kunth (*Andropogon aureus* Bory).

KEY TO THE SPECIES

1. One spikelet pediceled, the other sessile; second glume awnless; rachis readily disarticulating at maturity, the joints falling attached to the sessile spikelet.
   2. Inflorescence golden brown; hairs on the spikelets of the same color, 5–10 mm. long.....2. *E. leptostachys.*
   2. Inflorescence grayish brown; hairs on the spikelets silvery, about 2 mm. long or less.....1. *E. trispicata.*
1. Both spikelets pediceled; second glume with a slender awn 5 mm. or more long; rachis tardily disarticulating, the spikelets falling free from the pedicels.
   3. Spikelets reddish brown, about 0.4 mm. wide; fertile lemma with a twice geniculate awn 3–5 cm. long.....3. *E. irritans.*
   3. Spikelets brownish tan, about 0.7 mm. wide; fertile lemma awnless.....3a. *E. irritans* var. *egregia.*

1. **Eulalia trispicata** (Schult.) Henr., Blumea 3: 453. 1940; Ohwi, Bot. Mag. (Tokyo) 56: 10. 1942.

   Andropogon tristachyos Roxb., Fl. Ind. 1: 261. 1820 (non *A. tristachyus* H.B.K. 1816). Type from India.

   Andropogon trispicatus Schult., Mantissa 2: 452. 1824. Based on *A. tristachyos* Roxb.

   Eulalia argentea Brongn. in Duperry, Bot. Voy. Coquille 2: 92. 1830; Hitchc., Brittonia 2: 125. 1936. Type from the Moluccas.

Pollinia argentea (Brongn.) Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 2(1): 90, 1836; Hack. in DC., Monogr. Phan. 6: 162. 1889; K. Schum. & Hollr., Fl. Kais. Wilhelmsland 22. 1889.

Eulalia tristachya (Roxb.) Kuntze, Rev. Gen. 775. 1891; A. Camus, Ann. Soc. Linn. Lyon 68: 203. 1922.

? *Pollinia leptantha* Stapf, Kew Bull. 1909: 266. 1909. Type from Netherlands New Guinea.

Perennial (or sometimes annual?); culms erect, caespitose, 60–100 (rarely to 200) cm. tall, glabrous or slightly pubescent below the inflorescence; sheaths usually glabrous but sometimes pubescent, always more or less pubescent on the collar; ligule about 0.5 mm. long, ciliolate, usually with some longer hairs back of it; blades elongate, 3–5 mm. wide, flat, glabrous beneath, somewhat pilose above, especially near the base; racemes 3–20, digitate or approximate, 5–20 cm. long, the rachis clothed with soft white hairs, the joints about one-fourth shorter than the spikelet; pedicels slightly shorter than the rachis joint and bearing similar hairs; spikelets 2.5–3.5 (rarely to 4.5) mm. long; glumes equal, reddish brown, the first dorsally flattened, 2-nerved, the apex rounded; second glume 3-nerved, somewhat keeled; both glumes clothed with spreading white hairs, especially toward the margins, the hairs often 1 mm. long or more; sterile lemma about equaling the glumes, ciliate; fertile lemma 1.5–2 mm. long, bifid, the teeth often 1 mm. long, awned from between the teeth, the awn twisted and geniculate, 5–10 mm. long.

BRITISH NEW GUINEA: Western Division: Wuroi, Oriomo River, alt. 10–30 m., *Brass 5710* (A, US) (common on poorly drained grey soil of savannah ridges); Dagwa, Oriomo River, alt. 40 m., *Brass 5926* (A, US) (the principal grass on damp soil on open ridges); Lake Daviumbu, Middle Fly River, *Brass 7809* (A, US) (occasional in large tufts on savannahs), *Brass 7950* (A, US) (occasional on wet savannah plains); Gaima, Lower Fly River, *Brass 8279* (A, US) (occasional clumps on savannahs); Tarara, Wassi Kussa River, *Brass 8566* (A, US) (occasional tufts in savannah-forests), *Brass 8697* (A, US) (in native villages and gardens); Central Division: Sogeri, near Port Moresby, *L. S. Smith N. G. 98* (A) (in open forest); Northern Division: About 3½ miles south of Dobodura, *Reeder 821* (A, US) (in open grassland).

India to Australia, New Guinea, and Polynesia.

No type material of *Pollinia leptantha* was available, but from the description and study of numerous specimens of *Eulalia trispicata* from India to New Guinea, it does not appear to be distinct from that species.

2. **Eulalia leptostachys** (Pilger) Henr., Blumea 3: 453. 1940; Chase, Jour. Arnold Arb. 24: 88. 1943.

Pollinia leptostachys Pilger, Bot. Jahrb. 52: 170. 1914. Type from New Guinea.

Pollinia Cumingii sensu K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 166. 1901. (Specimen cited is type of *P. leptostachys*.)

Perennial with scaly rhizomes; culms 40–70 cm. tall, erect or ascending, the base sometimes geniculate, appressed-white-pubescent below the inflorescence, otherwise glabrous; sheaths subglabrous to more or less pubescent, always more or less pilose at the throat; ligule about 0.5 mm. long, ciliolate; blades linear-lanceolate, 6–15 (rarely 20) cm. long and as much as 10 mm. wide, glabrous to more or less short-pubescent, the margins scabrous, the base abruptly narrowed into a very short petiole at the junction with the sheaths; panicle contracted, the branches, pedicels, and spikelets covered with gold-brown hairs; axis 2–4 cm. long, bearing

4–10 densely flowered racemes, about 8–10 cm. long; spikelets 3–4 mm. long, bearing spreading brown hairs about twice their length; first glume somewhat flattened and 2-keeled toward the apex, truncate, erose, and stiffly short-ciliolate, usually 2–4-nerved, sometimes also with a midnerve; second glume 1–3-nerved, obscurely keeled, the apex truncate-obtuse, ciliolate; sterile lemma usually wanting; fertile lemma minute, bifid, the slender lobes ciliate; awn 1–2 cm. long, the base weakly twisted and geniculate, the bend less than 1 mm. above the apex of the spikelet.

BRITISH NEW GUINEA: North Eastern Division: Mount Obree, alt. about 2000 m., *W. S. Sawyer 76* (US). NORTHEAST NEW GUINEA: Morobe District: Ogeramnang, alt. about 1700 m., *Clemens 4725* (A); Kajabit Mission, alt. about 600 m., *Clemens 10867* (US) (open place at foot of mountain). NETHERLANDS NEW GUINEA: 9 km. northeast of Lake Habbema, alt. 2800 m., *Brass 10901* (A, US) (a few tufts on a dry open landslip in forest); Bele River, 18 km. northeast of Lake Habbema, alt. 2200 m., *Brass 11363* (A, US) (covering light gravelly [formerly forested] banks of river); Balim River, alt. 1600 m., *Brass 11825* (A, US) (locally abundant on long deforested slopes).

Endemic.

Eulalia leptostachys is related to both *E. Cumingii* (Nees) A. Camus and *E. fulva* (R. Br.) Kuntze, but it differs from both in having the panicle composed of longer, more numerous racemes, and spikelets with an awn which is only weakly twisted and geniculate, the bend occurring just above the tips of the glumes. *Eulalia fulva* has thick woolly culm bases and very thick racemes. *Eulalia Cumingii* has slender, creeping stolons, and the racemes are short and very slender. Both these species have been reported from New Guinea, but I have seen no specimens. They may represent misidentifications for *E. leptostachys*.

3. **Eulalia irritans** (R. Br.) Kuntze, Rev. Gen. 2: 775. 1891; Hitchc., Brittonia 2: 126. 1936.

Saccharum irritans R. Br., Prodr. Fl. Nov. Holl. 1: 203. 1810. Type from Australia.

Erianthus irritans (R. Br.) Kunth, Rev. Gram. 1: 160. 1829.

Pollinia irritans (R. Br.) Benth., Fl. Austral. 7: 525. 1879; Hack. in DC., Monogr. Phan. 6: 155. 1889.

Pseudopogonatherum irritans (R. Br.) A. Camus, Ann. Soc. Linn. Lyon 68: 205. 1921.

Annual; culms erect, 6–8-noded, glabrous, 60–100 cm. tall; sheaths glabrous, usually shorter than the internodes; ligule about 0.5 mm. long, minutely ciliolate; blades involute, attenuate, as much as 50 cm. long, glabrous below, glaucous and often more or less pubescent above, especially toward the base; panicle 10–15 cm. long, the common axis about 3 cm. long; racemes numerous, erect or ascending, the rachis very tardily disarticulating, about 0.4 mm. wide, the margins stiff-long-ciliate, the hairs longest toward the ends of the joints; spikelets reddish brown, more or less white-pilose, 2.5–3 mm. long, about 0.4 mm. wide (including the callus 3.5–4 mm. long), both alike and pediceled, the longer pedicel 2–2.5 mm., the shorter about 1 mm. long, the pedicels bearing hairs similar to those of the rachis; both spikelets disarticulating obliquely from the pedicels and forming a sharp callus bearing a tuft of stiff white hairs about half as long as the spikelet; glumes subequal, the first 2-nerved, rounded or flattened on the back, the apex minutely bidentate; second

glume 1–3-nerved, slightly keeled on the back, midnerve extending into a slender flexuous awn 5–7 mm. long with a short offset double bend at the base; sterile lemma wanting; fertile lemma narrow, hyaline, bearing a stout twice-geniculate awn, 3–5 cm. long, the lower half brown, twisted, and bearing white hairs 1.5–2 mm. long, the upper half pale and slender; anthers about 1 mm. long.

BRITISH NEW GUINEA: Western Division: Wuroi, Oriomo River, *Brass 5733* (A, US) (scattered on low grey soil of savannah ridges); Mabaduan, *Brass 6524* (A, US) (rare grass in savannah forests); Lake Daviumbu, Middle Fly River, *Brass 7645* (A, US) (not common in savannahs in this locality); Gaima, Lower Fly River, *Brass 8251* (A, US) (open savannah forests, not common); Central Division: Port Moresby to Kalo, *MacGregor 53* (US); South Eastern Division: *Chalmers 71* (US).

Australia and New Guinea to the Philippines.

3a. **Eulalia irritans** (R. Br.) Kuntze var. **egregia** var. nov. PLATE VII, *Figs. d, e.*

A typo lemmate fertili mutica, spiculis latioribus et paullo longioribus, arista glumae secundae longioribus et paullo crassioribus, pedicellis paullo longioribus differt.

BRITISH NEW GUINEA: Western Division: Wai Kussa River, *MacGregor 8* (US, TYPE), 1890.

The most striking character of this variety is the absence of the awn on the fertile lemma (one spikelet at the base of one of the racemes had an awn 30 mm. long, twice geniculate, and similar in other respects to those of the species; all other spikelets were without such awns). Further differences are seen in the spikelets, which are of a lighter brown color, noticeably broader and slightly longer, the awn of the second glume being somewhat longer and not so slender; the anthers are about 1.5 mm. long as compared with 1 mm. for *E. irritans*, and the pedicels are 1.5–2 mm. and 3 mm. long rather than 1 mm. and 2–2.5 mm. as in the species. Unfortunately only one specimen was available for study. With additional collections this form may prove to be a distinct species.

29. **Microstegium** Nees

Microstegium Nees in Lindl., Nat. Syst. 447. 1836.

Pollinia Trin., Mém. Acad. St. Pétersb. VI. 2: 304. 1832 (non Spreng. 1815).

Leptatherum Nees, Proc. Linn. Soc. 1: 92. 1841.

Spikelets in pairs, one sessile or subsessile, the other pediceled, both alike and perfect or the upper sometimes reduced, falling free from the pedicel, the lower spikelet falling with the joint of the rachis and the pedicel of the upper spikelet; glumes chartaceous or membranous, the first usually distinctly dorsally grooved, the second laterally compressed, cymbiform; sterile lemma wanting or rarely well developed, sometimes bearing a staminate flower; fertile lemma small, often reduced to a narrow base of a straight or twisted awn. Mostly annuals with straggling culms, lanceolate blades usually narrowed into short petioles, and few to many digitate or approximate racemes.

TYPE SPECIES: *Microstegium Willdenowianum* Nees = *M. vimineum* (Trin.) A. Camus (*Andropogon vimineus* Trin.).

KEY TO THE SPECIES

1. Rachis joints ciliate, shorter than the sessile spikelet; sterile lemma wanting or very much reduced.
   2. Blades 15–25 mm. wide; racemes 15–40.....1. *M. spectabile.*
   2. Blades mostly 4–12 mm. wide; racemes 2–10.....2. *M. ciliatum.*
1. Rachis joints glabrous, very slender, equaling or exceeding the sessile spikelet; sterile lemma about as long as the glumes.....3. *M. nudum.*

1. **Microstegium spectabile** (Trin.) A. Camus, Ann. Soc. Linn. Lyon 68: 200. 1921; Hosakawa, Jour. Soc. Trop. Agr. 7: 310. 1935.

Pollinia spectabilis Trin., Mém. Acad. St. Pétersb. VI. 2: 305. 1832; Hack. in DC., Monogr. Phan. 6: 174. 1889, Bot. Jahrb. 13: 260. 1890. Type from the Carolines.

Pollinia pleiostachya Lauterb. & K. Schum. in K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 168. 1901. Type from Northeast New Guinea.

Microstegium pleiostachyum (Lauterb. & K. Schum.) A. Camus, Ann. Soc. Linn. Lyon 68: 200. 1921.

Culms prostrate, branching, more than a meter long, firm, glabrous throughout or the lower nodes sometimes minutely bearded; sheaths striate, keeled above, glabrous or more or less papillose-pilose near the margins, the upper margins extending into slight auricles 1.5–2 mm. long connected by the membranous ligule; blades lanceolate, 10–18 cm. long, 15–25 mm. wide, the midrib whitish and prominent below, glabrous, the margins scabrous; apex acuminate, the base narrowed into a short petiole about 2 mm. long; panicle 8–14 cm. long, composed of 15–40 approximate racemes; rachis slender, bristly-ciliate on the margins, the joints slightly shorter than the subsessile lower spikelets, the pedicel about three-fourths as long as the rachis joint, also bristly-ciliate; lower spikelet 3–3.5 mm. long, the callus short-bearded; first glume obscurely 4-nerved (sometimes with a midnerve), the margins scabrous-pectinate toward the acuminate entire or minutely bifid apex; second glume 1–3-nerved, acuminate or aristulate, the prominent keel scabrous-pectinate; sterile lemma wanting; fertile lemma minute, bearing a slender capillary weakly twisted awn 1–3 times as long as the spikelet; anthers 1.5–2 mm. long; the upper spikelet similar but slightly smaller, the nerves of the glumes often more prominent.

BRITISH NEW GUINEA: Central Division: Koitaki, *Carr 12236* (US) (in forest). NORTHEAST NEW GUINEA: Morobe District: Boana, alt. about 1000 m., *Clemens 41715* (US). NETHERLANDS NEW GUINEA: 4 km. southwest of Bernhard Camp, Idenburg River, alt. 850 m., *Brass 13720* (A, US) (occasional in young seral rain-forest on sandy flood banks).

The Carolines to New Guinea and the Philippines.

Closely related to *Microstegium gratum* (Hack.) A. Camus, but differing in having glabrous culms, sheaths often papillose-pilose on the margins, and much more numerous racemes. *Microstegium gratum* has culms pubescent below the nodes and inflorescence, the awn of the fertile lemma stout and distinctly geniculate, and anthers about 3 mm. long. The Brass specimen was cited as *M. gratum* by Chase (18, p. 88). The specimens cited as *Pollinia grata* Hack. by Ridley (62, p. 249) and White (75, p. 15) may also represent *M. spectabile.* I have seen no specimens of *M. gratum* from New Guinea.

2. **Microstegium ciliatum** (Trin.) A. Camus, Ann. Soc. Linn. Lyon 68: 201. 1921.

Pollinia ciliata Trin., Mém. Acad. St. Pétersb. VI. 2: 306. 1832. Type from India.

Culms slender, 60–100 cm. tall, glabrous or the nodes sometimes puberulent; sheaths shorter than the internodes, glabrous or rarely pilose near the margins, the hairs sometimes papillose-based; ligule membranous, brownish, puberulent, 1–2 mm. long; blades linear-lanceolate, 5–10 cm. long, 4–10 (rarely to 15) mm. wide, acuminate, the base narrowed into a short petiole; racemes 2–10, 4–8 cm. long, approximate, the rachis ciliate, readily disarticulating, the joints slightly shorter than the spikelets; sessile spikelets 3–4.5 mm. long; first glume dorsally grooved, acute or bidentate; second glume acute or with a short awn; sterile lemma minute or wanting; fertile lemma minute, bearing a well developed awn; anthers about 1.5 mm. long.

2a. **Microstegium ciliatum** (Trin.) A. Camus var. **laxum** (Nees ex Steud.) comb. nov.

Pollinia laxa Nees ex Steud., Syn. Pl. Glum. 1: 401. 1854. Type from India.

Andropogon breviaristatus Steud., Syn. Pl. Glum. 1: 397. 1854. Based on *P. laxa*.

Pollinia ciliata Trin. var. *laxa* (Nees ex Steud.) Hack. in DC., Monogr. Phan. 6: 176. 1889.

Microstegium breviaristatum (Steud.) Keng, Sinensia 3: 92. 1932.

Microstegium ciliatum (Trin.) A. Camus var. *latifolium* Ohwi, Bot. Mag. (Tokyo) 56: 10. 1942. Type from Netherlands New Guinea.

Differing from the species in having rachis joints only shortly ciliate, the first glume bidentulate, and the second glume bearing a capillary awn 1–4 mm. long; awn of the fertile lemma slender, flexuous, 8–20 mm. long.

NETHERLANDS NEW GUINEA: Waren, 60 miles south of Manokwari, *Kanehira & Hatusima 13243* (A, type collection of *M. ciliatum* var. *latifolium*) (in rain-forest).

3. **Microstegium nudum** (Trin.) A. Camus, Ann. Soc. Linn. Lyon 68: 201. 1921.

Pollinia nuda Trin., Mém. Acad. St. Pétersb. VI. 2: 307. 1832; Hack. in DC., Monogr. Phan. 6: 178. 1889. Type from India.

Eulalia nuda (Trin.) Kuntze, Rev. Gen. 2: 775. 1891.

Culms very slender, decumbent and rooting at the nodes; sheaths glabrous or minutely pubescent, the margins often ciliate; ligule membranous, about 0.2 mm. long; blades lanceolate or linear-lanceolate, 1.5–6 cm. long, 4–8 mm. wide, glabrous or the upper surface bearing scattered short papillose-based hairs; racemes 3–6, borne on a slender glabrous axis 6–12 mm. long; rachis slender, trigonous, glabrous, the joints about one and one-half times longer than the sessile spikelet, the slender glabrous pedicels one-third to half as long as the rachis joints; spikelets narrowly lanceolate, about 4 mm. long, glabrous except for the very short hairs on the callus; first glume 4–6-nerved, acute or bidentulate; second glume 1–3-nerved, minutely aristulate, prominently keeled on the back; sterile lemma hyaline, nerveless, about as long as the glumes; fertile lemma about one-fourth shorter, 1-nerved, the nerve extending into a very slender flexuous awn 8–15 mm. long.

NORTHEAST NEW GUINEA: Morobe District: Samanzing, alt. about 1600 m., *Clemens 10279* (US) (on steep open trail).

India to Japan, Formosa, and Malaysia.

30. **Pogonatherum** Beauv.

Pogonatherum Beauv., Ess. Agrost. 56. *pl. 11, fig. 7.* 1812.

Spikelets paired, one sessile and perfect, the other pediceled and pistil-

late, falling free from the pedicel, the sessile spikelet falling with the rachis joint and the pedicel of the upper spikelet; glumes membranous, subequal, the first 3-nerved, truncate, ciliate, the second 1-nerved, keeled and bearing a long slender awn from just below its bifid apex; lemmas hyaline, the sterile empty or wanting, the fertile bifid and bearing a long slender awn equaling or exceeding that of the second glume; stamens 2 or 1. Rather low and slender perennials with terminal solitary spikelike racemes.

TYPE SPECIES: *Pogonatherum saccharoideum* Beauv. = *P. paniceum* (Lam.) Hack. (*Saccharum paniceum* Lam.).

1. **Pogonatherum paniceum** (Lam.) Hack., Allg. Bot. Zeitschr. 12: 178. 1906; Hitchc., Proc. Linn. Soc. N. S. Wales 54: 145. 1929.

Saccharum paniceum Lam., Encycl. 1: 595. 1783, Illustr. 1: *pl. 40, fig. 3.* 1791. Type from India.

Andropogon crinitum Thunb., Fl. Jap. 40. *pl. 7.* 1784. Type from Japan.

Pogonatherum saccharoideum Beauv., Ess. Agrost. 56, 176. *pl. 11, fig. 7.* 1812; K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 168. 1901. Based on *Saccharum paniceum* Lam.

Pogonatherum crinitum (Thunb.) Kunth, Enum. 1: 478. 1833; Hack., Denkschr. Akad. Wiss. Math.-Naturw. (Wien) 89: 492. 1913.

Culms densely tufted, 15–40 cm. tall, delicate or somewhat coarse, the nodes often white-bearded; sheaths usually long-pilose in the throat, the margins often ciliate; ligule white, membranous, puberulent, about 0.5 mm. long; blades 2–5 cm. long, 1–4 mm. wide, flat or sometimes involute, often scabrous above; racemes solitary, 15–30 mm. long, slender, whitish or yellowish, the rachis joints and pedicels white-villous, about half as long as the spikelets; spikelets 2.5–3 mm. long, the callus hairs as long as the spikelets or shorter; first glume 3-nerved, the truncate apex ciliate; second glume laterally compressed, keeled, 1-nerved, the nerve extending into a long slender awn; sterile lemma shorter than the glumes (sometimes wanting), nerveless; fertile lemma shorter than the glumes, 1-nerved, long-awned from the bifid apex; palea often as long as the lemma; stamens usually 2 (sometimes 1), the anthers about 1.5 mm. long; awns of the second glume and fertile lemma similar, about 10 mm. long.

BRITISH NEW GUINEA: Central Division: Budotobara, *Brass 768* (GH, US) (wet rock crevices); Mafulu, alt. 580 m., *Brass 5270* (GH, US) (crevices in river-bed rocks); Kanosia, *Carr 11345* (US, NY) (river banks, low down and subject to frequent flooding); Eastern Division: Kurandi, *Brass 1391* (GH, US) (small grass in crevices of river-bed rocks); Western Division: Fly River, *Wm. Bauerlen 43* (US); Fly River, 528-mile camp, alt. 80 m., *Brass 6810* (A, US) (occasional on rocky river banks swept by floods); Lower Fly River opposite Sturt Island, *Brass 8220* (A, US) (tufted on moist cliff face). NORTHEAST NEW GUINEA: Morobe District: *Clemens 6548a* (A); Kajabit, Markham Valley, *Clemens 10552* (US); near Finschhafen, *Reeder 886* (A, US) (growing in cracks of rocks above a waterfall in a small stream, abundant in this location). NETHERLANDS NEW GUINEA: Hollandia, *T. C. Baim* (sine no.) in 1945 (A) (dry gravelly bank of stream); Bele River, 18 km. northeast of Lake Habbema, alt. 2350 m., *Brass 11568* (A, US) (abundant on a precipitous limestone slope); Balim River, alt. 1600 m., *Brass 11631* (A, US) (abundant on dry rocky ground on deforested slopes); 4 km. southwest of Bernhard Camp, Idenburg River, alt. 850 m., *Brass 13479* (A, US) (abundant on a flood-swept rocky river bank); Rouffaer River, alt. about 175 m., *Docters van Leeuwen 9995* (GH, NY). SOLOMON ISLANDS: San

Cristoval: Hao River, *Brass 2893* (GH) (rock crevices on the river bank; common); Ysabel: Maruto, alt. 300 m., *Brass 3386* (GH) (on rocks in river bed, common).

Eastern Asia, Malaysia to Australia and New Guinea.

A very distinctive little grass, usually to be found growing in rock crevices along rivers. Easily recognized by its short, solitary, yellowish panicles with 2-awned spikelets.

31. **Sclerandrium** Stapf & C. E. Hubb.

Sclerandrium Stapf & C. E. Hubb., Hook. Ic. 33: *pl. 3262*. 1935.

Spikelets paired, dimorphic, one pediceled, the other sessile, the pairs alternately arranged along a slender, not or tardily disarticulating rachis; sessile spikelet more or less persistent on the rachis, dorsally compressed, bearing two staminate flowers; first glume indurated, shorter than the second, the apex truncate, emarginate or dentate; second glume membranous, obtuse to truncate, as long as the spikelet; lemmas hyaline, the lower obtuse, the upper mucronate or awned, stamens 2; pediceled spikelet readily disarticulating from the pedicel, bearing one perfect flower; glumes equal, coriaceous; fertile lemma bearing a long geniculate awn; stamens 2; pistil with a distinct style and two long plumose stigmas. Perennials with flat linear blades and 2–several digitate or approximate racemes.

TYPE SPECIES: *Sclerandrium truncatiglume* (F. Muell. ex Benth.) Stapf & C. E. Hubb. (*Ischaemum truncatiglume* F. Muell. ex Benth.).

1. **Sclerandrium truncatiglume** (F. Muell. ex Benth.) Stapf & C. E. Hubb., Hook. Ic. 33: *pl. 3262*. 1935; Chase, Jour. Arnold Arb. 20: 314. 1939.

Ischaemum truncatiglume F. Muell. ex Benth., Fl. Austral. 7: 518. 1878. Type from Australia.

Culms caespitose, 3–5-noded, 80–150 cm. tall, glabrous; sheaths firm, shorter than the internodes, glabrous or slightly pilose in the throat; ligule membranous, about 1 mm. long; blades as much as 50 cm. long, 5–10 mm. wide, acuminate, the base attenuate, the upper surface sparsely pilose toward the base, otherwise glabrous; racemes 3–6, erect, 8–12 cm. long, the common axis about 1.5 cm. long; rachis slender, pilose, the internodes about 3 mm. long; sessile spikelets 5–6.5 mm. long; first glume 3.5–5 mm. long, truncate to 2–3-toothed, smooth and shining on the back, ciliate with white hairs 1–2 mm. long on the margins and apex, inside 5–7-nerved, the nerves anastomosing below the apex; second glume short-appressed-pilose, the hairs longer on the margins and toward the apex; lower lemma lanceolate, 4–5 mm. long, the palea similar but slightly wider, both more or less pubescent; upper lemma slightly shorter than the fertile, the apex bearing an awn up to 3 mm. long, the lemma and slightly longer palea more or less pubescent; pediceled spikelet 3–3.6 mm. long, the slender pilose pedicel about 2 mm. long, the spikelet disarticulating obliquely with a sharp-pointed brown hairy callus; glumes brown, pilose, with spreading whitish hairs about 1 mm. long; fertile lemma with an awn 16–25 mm. long, the column 5–9 mm. long, spreading-pilose with white hairs about 1 mm. long.

BRITISH NEW GUINEA: Western Division: Tarara, Wassi Kussa River,

Brass 8537 (A, US) (uncommon on savannah-forest ridges), *Brass 8665* (A, US) (occasional on banks of streams in savannah forest).

Australia and New Guinea.

32. Ischaemum L.

Ischaemum L., Sp. Pl. 1049. 1753, Gen. Pl. ed. 5. 469. 1754.
Meoschium Beauv., Ess. Agrost. 111. *pl. 21, fig. 4.* 1812.

Spikelets paired, one sessile or subsessile and perfect, falling with the rachis joint and the pedicel of the upper spikelet, the other pediceled, staminate or perfect, falling free from the pedicel; rachis joints and pedicels trigonous or rarely convex on the back, usually ciliate along the edges; glumes firmly indurate, the first flat or slightly rounded on the back, the margins inflexed; second glume cymbiform, keeled on the back or rarely rounded, the apex acuminate or aristate; sterile lemma membranous or hyaline, enclosing a palea and a staminate flower; upper floret perfect or pistillate, the lemma hyaline, usually 2-cleft and awned from the base of the cleft; first glume of the pediceled spikelet often with one margin strongly inflexed, the glume thus appearing laterally compressed. Annuals or perennials with usually binate or digitate (rarely solitary) racemes.

TYPE SPECIES: *Ischaemum muticum* L.

KEY TO THE SPECIES

1. Racemes solitary or binate.
   2. Racemes binate, often closely appressed and appearing as a solitary cylindrical spike; rachis joints and pedicels trigonous.
      3. Culms prostrate, creeping; fertile lemma mucronate or with a short straight (3 mm. long or less) awn from the apex.....3. *I. muticum.*
      3. Culms erect or ascending; fertile lemma deeply cleft and bearing a geniculate and twisted awn from the base of the cleft.
         4. Plants 60–150 cm. tall; first glume of pediceled spikelet acute or bifid, not aristate.
            5. Sessile spikelet (including the callus) 7–9 mm. long; rachis joints about 5 mm. long; first glume stramineous or brownish.....1. *I. aristatum.*
            5. Sessile spikelet (including the callus) about 6 mm. long; rachis joints about 4 mm. long; first glume purple-flecked.....2. *I. pubescens.*
         4. Plants 20–40 cm. tall; both glumes of pediceled spikelet aristate; callus yellow-bearded.
            6. Second glume of the sessile spikelet with an awn 5–6 mm. long; glumes of the pediceled spikelets long-pilose on the keels, aristate, the awns 3–4 mm. long.....4. *I. foliosum.*
            6. Second glume of the sessile spikelet with an awn only 1–2 mm. long; glumes of the pediceled spikelets scabrous on the keels, short-aristate, the awns only 0.5–1 mm. long.....5. *I. littorale.*
   2. Racemes solitary; rachis joints and pedicels hemispheric-convex on the back, the inner cavity closed by a thin hyaline membrane.....9. *I. fragile.*
1. Racemes 3–7, digitate or approximate.
   7. Sessile spikelet with a well developed geniculate and twisted awn; first glume stramineous or brownish.
      8. Sessile spikelet with a geniculate awn; pediceled spikelet mucronate or with a short straight awn.....7. *I. digitatum.*

8. Both sessile and pediceled spikelets with well developed geniculate awns.... .....8. *I. intermedium.*

7. Sessile spikelet with a straight awn 5–6 mm. long; pediceled spikelet awnless; first glume purple-flecked.....6. *I. Turneri.*

1. **Ischaemum aristatum** L., Sp. Pl. 1049. 1753; Blatter & McCann, Imp. Council Agric. Res. Sci. Monogr. 5: 11–12, *pl. 6.* 1935; Hitchc., Brittonia 2: 126. 1936. Type from China.

Ischaemum arundinaceum F. Muell. ex Benth., Fl. Austral. 7: 519. 1878; Chase, Jour. Arnold Arb. 20: 313. 1939. Type from Australia.

Culms erect or decumbent at base, 60–150 (sometimes to 200) cm. tall, stout or rather slender, the internodes often pruinose; nodes glabrous or bearded; sheaths keeled above, usually glabrous, the margins extending into auricles 3–6 mm. long connected by the membranous, often somewhat shorter ligule; blades linear-lanceolate, 10–30 cm. long, 8–15 (rarely to 20) mm. wide, acuminate, the base sometimes rounded or subcordate but more often gradually tapering, usually glabrous on both surfaces (rarely somewhat pubescent), the margins scabrous; racemes 2, erect, usually closely appressed and appearing more or less as one cylindrical spike, 5–15 cm. long; rachis joints about 5 mm. long, 3-angled and ciliate on the angles; pedicels somewhat shorter, similar to the rachis joint and parallel to it; sessile spikelets stramineous or brownish, oblong, 7–9 mm. long including the bearded callus; first glume nearly smooth to more or less prominently rugose below, striate above, the keels winged; fertile lemma cleft to the middle and bearing from the base of the cleft a twisted and geniculate awn 10–15 mm. long; pediceled spikelets slightly shorter, usually broadly winged along the external keel, awnless.

BRITISH NEW GUINEA: Western Division: Wuroi, Oriomo River, alt. 10–30 m., *Brass 5726* (GH, US) (common amongst bushy growth on fringe of forest); Lake Daviumbu, Middle Fly River, *Brass 7900* (A, US) (dominating [often the only grass] over large areas of low savannah and wet grass plains); Lower Fly River, *Brass 8259* (A, US) (common in savannah forests); Tarara, Wassi Kussa River, *Brass 8751* (A, US) (not common in savannah forests).

India to China, the Philippines, Malaysia, New Guinea, to Australia.

Typical *Ischaemum aristatum* from China has the lower part of the first glume prominently transversely rugose or at least with rather prominent marginal undulations. In *I. arundinaceum* from Australia the first glume is smooth or with only weak undulations on the margins. In all other respects these two species are practically indistinguishable. Since there is no other character on which to separate these "species" except the presence or absence of undulations on the first glume, and in that it seems to be a matter only of degree, they are considered here to be components of one variable species. The New Guinea material varies from having the first glume smooth to rather noticeably undulate.

1a. **Ischaemum aristatum** L. subsp. **barbatum** (Retz.) Hack. in DC., Monogr. Phan. 6: 204. 1889; Chase, Jour. Arnold Arb. 20: 314. 1939.

Ischaemum barbatum Retz., Obs. Bot. 6: 35 [error for 25]. 1791. Type from Java.

Differing from the species in having sessile spikelets more or less dorsally villous, and pediceled spikelets glabrous or villous. The sheaths are often pilose.

BRITISH NEW GUINEA: Western Division: Dagwa, Oriomo River, alt. 40 m., *Brass 5928* (A, US) (forming large patches on open slopes); Gaima, Lower

Fly River, *Brass 8260* (A, US) (occasional in savannah forest grass cover); Daru Island, *Brass 6040* (GH, US) (very abundant on wet savannahs of center of Island), *Brass 6253* (A, US) (frequent in tall grass cover of savannah forests). NETHERLANDS NEW GUINEA: Hollandia and vicinity, alt. 20–100 m., *Brass 8815* (A, US) (covering extensive deforested slopes in association with *Gleichenia* sp. or in pure stands).

Indo-Malayan region to New Guinea.

This subspecies is distinguishable on no other character than the pilose first glume. I suspect that this is not reliable and that plants may be pilose when young and become glabrous in age. *Ischaemum barbatum* Retz. var. *arfakense* (Rendle) Ohwi (56, p. 11) is probably this subspecies. *Brass 6040* has exceptionally hairy sheaths and was reported as *I. aristatum* var. *Meyenianum* (Nees) A. Camus, by Hitchcock (35, p. 126). *Brass 8260* was reported as *I. pubescens* by Chase (17, p. 314).

2. **Ischaemum pubescens** Merr., Philip. Jour. Sci. Bot. 9: 264. 1914. Type from the Philippines.

Perennial; culms glabrous, pruinose below the nodes, 70–100 cm. tall, the nodes bearded; sheaths rather loose, the lower softly pilose, the upper more or less glabrous, the margins extending into auricles 2–3 mm. long connected by the brown hyaline ligule; blades softly pilose on both surfaces, the margins scabrous, 10–18 cm. long, 6–12 mm. wide, acuminate, the base of the upper rounded, of the lower gradually narrowed; racemes 2, closely appressed, 6–10 cm. long, long-exserted; rachis joints about 4 mm. long, 3-angled, ciliate-pilose on the angles; pedicels similar, about 3 mm. long; sessile spikelets oblong, about 6 mm. long including the callus, 1.8 mm. wide, the callus white-bearded; first glume indurate, the base with two obscure undulations, the upper half winged, the wings serrulate-scabrous, the back purple-flecked and usually bearing a few scattered hairs; second glume keeled on the back, indurate like the first; lemmas hyaline, the sterile entire, the fertile cleft to the middle and bearing in the cleft a geniculate twisted awn 8–13 mm. long; pediceled spikelets of about the same size and color as the sessile, the first glume sparingly pilose on the back, broadly winged on one side, the wing serrulate scabrous.

NETHERLANDS NEW GUINEA: Balim River, alt. 1600 m., *Brass 11617* (A, US) (one of the most abundant grasses on deforested slopes), *Brass 11732* (A, US) (very abundant, sometimes dominant on sandy soil of deforested slopes).

Philippines, New Guinea.

Closely allied to *Ischaemum aristatum* L. subsp. *barbatum* (Retz.) Hack. but distinguishable by its smaller spikelets with the first glume purplish-flecked rather than stramineous, the shorter rachis joints, and the pilose blades.

3. **Ischaemum muticum** L., Sp. Pl. 1049. 1753; K. Schum., Bot. Jahrb. 9: 197. 1887; Hack. in DC., Monogr. Phan. 6: 212. 1889. Type from India.

Perennial; culms long-prostrate, glabrous and often pruinose, the ascending flowering branches 15–50 cm. tall; upper sheaths overlapping, the lower shorter than the internodes, glabrous to more or less papillose-villous toward the margins; ligule membranous, truncate, glabrous or ciliolate, 0.5–1 mm. long; blades linear-lanceolate to lanceolate, 6–12 cm. long, 5–15 mm. wide, the base cordate and with a petiole about 1 mm. long; racemes 2, usually partly included in the upper sheaths, 2.5–4 cm. long;

rachis joints 3-angled, stout, about half as long as the sessile spikelet, the angles glabrous, scabrous, or sometimes short ciliate; pedicels about as long as the rachis joint, similar but usually slightly more slender; sessile spikelet glabrous, smooth and shining, 7–9 mm. long including the 1.5–2 mm. long callus; glumes firmly indurate, the first obovate-lanceolate, the apex acute or shortly bidentate, the keels on the upper half with broad membranous wings; second glume prominently wing-keeled, acute or shortly aristate; sterile lemma chartaceous, the margins with a hyaline wing toward the apex, the palea of like texture but slightly longer; fertile lemma membranous, mucronate or with an awn as much as 3 mm. long, the palea of like texture; pediceled spikelet about 6 mm. long, perfect or rarely sterile.

BRITISH NEW GUINEA: Central Division: Hula, *Brass 514* (GH, US) (a sand binding grass; just above tide mark); Hisiu, *Carr 11413* (NY) (sandy beach); Eastern Division: Bomgwina, *Brass 1616* (GH, US) (common beach grass); Gulf Division: Vailala, *Brass 1177* (GH, US) (very common on the beaches); Western Division: Coast between Oriomo and Fly Rivers, *Brass 6410* (A, US) (abundant as a sand binder on beaches). NORTHEAST NEW GUINEA: Morobe District: Finschhafen, *Weinland 347* (US). NEW BRITAIN: *R. Parkinson 47* (US); Rabaul, *Herre 185* (NY) (seashore). SOLOMON ISLANDS: San Cristoval: Waimamura, *Brass 2646* (GH) (on cleared land near the sea, abundant).

India to Australia, New Guinea and many Pacific Islands.

4. **Ischaemum foliosum** Hack. in DC., Monogr. Phan. 6: 222. 1889. Habitat in New Ireland and New Caledonia.

Ischaemum murinum var. *spiculis majoribus* Balansa, Bull. Soc. Bot. France 19: 323. 1872. Habitat in New Caledonia.

Culms rather slender, ascending from creeping bases, 20–30 cm. tall, the nodes bearded with ascending white hairs 3–5 mm. long; sheaths longer than the internodes, slightly keeled above, toward the margins papillose-pilose with white hairs 4–5 mm. long; ligule membranous, ciliate, 0.5–1 mm. long; blades linear to sublanceolate-linear, 4–8 cm. long, 4–7 mm. wide, acuminate, narrowed toward the base, glabrous below, the upper surface somewhat glaucous and papillose-pilose toward the base; racemes binate, about 3 cm. long; rachis joints and pedicels trigonous, rather stout, 2.5–3 mm. long, the angles ciliate with yellow hairs 2–3 mm. long, the callus densely bearded with similar hairs; sessile spikelet lanceolate, about 6 mm. long including the callus; first glume acuminate, bimucronate, the basal part glabrous, the upper two-thirds scabrous, the narrow keel wings ciliolate-scabrous; second glume equal to the first, somewhat rounded on the back, bidentate, bearing from between the teeth an awn 5–6 mm. long; sterile lemma slightly shorter than the glumes; fertile lemma bifid, the teeth 1–1.5 mm. long, awn 18–20 mm. long, the column about 6 mm. long; pediceled spikelet with both glumes long-pilose on the keels, aristate, the awn 3–4 mm. long; awn of the upper lemma like that of the sessile spikelet.

New Ireland to New Caledonia.

The only specimen seen was a duplicate of the second specimen cited in the original description (*Balansa 707*).[19] The description was drawn up

[19] Specimen from the Hackel Herbarium in Vienna now deposited in the United States National Herbarium.

from this plant and from Hackel's original description. Included in this paper since the first cited specimen was from New Ireland.

5. **Ischaemum littorale** sp. nov. PLATE VII. *Figs. a-c.*

Perennis 20–40 cm. alta; culmis glabris, caespitosis, erectis vel adscendentibus; nodis supra albo-barbatis, inferne demum glabratis; vaginis supra carinatis, quam internodiis plerumque longioribus, papilloso-pilosis, pilis laxis et longis; ligula membranacea, ciliolata, circiter 1 mm. longa; laminis planis vel plus minusve involutis, 3–8 cm. longis, 2–4 mm. latis, acuminatis, basin versus leviter angustatis, subtus scabris, supra papilloso-pilosis, pilis albis, laxis, marginibus glabris vel apicem versus scabris; racemis binatis, longe exsertis, 2–4 cm. longis; articulis pedicellisque subaequalibus, trigonis, 2.5–3 mm. longis, utroque latere circiter 0.5 mm. lata, angulis exterioribus dense ciliatis, pilis luteis circiter 1 mm. longis; spicula sessili straminea vel fulva, callo 1 mm. longo incluso circiter 5 mm. longa; glumis subaequalibus gluma prima anguste lanceolata, apice acuminata, bifida, carinata anguste alata, dorso plana, glabra, inferne levi, superne scaberula, praeter carinas 2–3-nervia; gluma secunda dorso inferne convexa, superne carinata, carina scaberrima, alioquin glabra levi, infra apicem minute bidentatum aristulam 1–2 mm. longam exserente; lemmate sterili 3-nervio, quam glumis paullo breviore, palea quam lemmate paullo breviore, antheris circiter 2 mm. longis; lemmate fertili quam lemmate sterili paullo breviore, in ½ superiore bifido, arista 15–20 mm. longa, columna fusca circiter 5 mm. longa; stigmatibus circiter 3 mm. longis, staminibus abortivis; spicula pedicellata lanceolata, glumis aequalibus vel subaequalibus, acuminatis, mucronatis vel aristatis, arista ad 1 mm. longa.

SOLOMON ISLANDS: San Cristoval: Waimamura, *Brass 2593* (GH, TYPE), August 5, 1932 (among coral rocks just above high water mark, common), *Brass 2813bis* (GH).

Ischaemum littorale is of the alliance of *I. foliosum,* from which it differs in having narrower blades, which are papillose-pilose above rather than glabrous, more slender rachis joints and pedicels, which bear shorter hairs on the outer angles, and in the much shorter awn on the second glume of the sessile spikelet. A further difference is seen in the pediceled spikelets, which have glumes bearing awns only up to 1 mm. long rather than 3–4 mm. long as in *I. foliosum.*

Comparison may also be made with *Ischaemum aureum* (Nees) Hack., but that species has glabrous nodes and sheaths, blades which are glabrous or only sparsely pilose at the base and on the margins, larger spikelets in which the second glume bears an awn about twice as long as that of *I. littorale,* and glumes of the pediceled spikelets long-ciliate on the keels.

6. **Ischaemum Turneri** Hack. in DC., Monogr. Phan. 6: 232. 1889; K. Schum., Notizbl. Bot. Gart. Berlin 1: 206. 1896. Type from New Ireland.

Sheaths glabrous, shorter than the internodes; ligule glabrous with a row of hairs in back of it; blades 10–15 cm. long, 12–18 mm. wide, more or less rigid, at first clothed with appressed hairs, becoming glabrous, the margins scabrous; racemes 3–4, 4–7 cm. long; rachis joints and pedicels about equal or the pedicel slightly longer, both trigonous, stout, ciliate on

the interior angles, somewhat bowed out at the base and slightly excavated within, leaving a small oblong opening between them; sessile spikelet 8–9 mm. long including the 1.8 mm. long glabrous callus; first glume purple-flecked on the back, narrowly winged on the upper half, the wings ciliolate-scabrous, the apex acuminate, entire; second glume equal to the first, rounded on the back and with a narrowly winged keel toward the apex; fertile lemma with a straight awn 5–6 mm. long; pediceled spikelet about 7 mm. long, similar to the sessile but the fertile lemma only mucronate, not awned.

NEW IRELAND: *Turner* (fragment of the TYPE specimen consisting of three rachis joints with three sessile and two pediceled spikelets attached) [20] (US).

New Britain, New Ireland, and New Caledonia.

No specimen was seen other than the small fragment cited. The description is a modification of the original by Hackel. Unfortunately Hackel was unable to give the height of the plant or any indication of its habit, since his description was based on a fragmentary specimen.

7. **Ischaemum digitatum** Brongn. in Duperry, Bot. Voy. Coquille 2: 70. *pl. 13.* 1831; Hack., Bot. Jahrb. 6: 238. 1885, in DC., Monogr. Phan. 6: 233. 1889. Type from the Moluccas.

Culms glabrous, ascending from a decumbent base, as much as 2 meters tall; the nodes sometimes sparsely bearded; sheaths keeled at least above, rather loose, glabrous or sparsely pilose; ligule membranous, 2–3 mm. long; blades linear-lanceolate, 15–30 cm. long, 6–15 (rarely to 20) mm. wide, glabrous, the margins scabrous; racemes 4–7 (rarely only 3), 5–8 cm. long; rachis joints and pedicels about equal, trigonous, the angles scabrous or short-ciliate, about 4 mm. long, bowed out equally at the base and slightly excavated within leaving a round or oblong opening between them; sessile spikelet 5–7 mm. long including the 1.5 mm. callus, 1.5 mm. wide, first glume smooth and shining below, the upper two-thirds striate, scabrous, the apex bidentate, the keels winged; second glume rounded on the back, narrowly wing-keeled toward the apex; sterile lemma as long as the glumes, acuminate; fertile lemma deeply cleft and bearing a geniculate twisted awn from the base of the cleft, the awn bent below the middle; pediceled spikelets similar but the fertile lemma entire or only slightly cleft, the awn short, not geniculate.

BRITISH NEW GUINEA: Central Division: Veiya, *Carr 11736* (NY) (river bank in the open); Western Division: Lake Daviumbu, Middle Fly River, *Brass 7528* (A, US) (savannahs; dominant grass of swamp margins); Daru Island, *Brass 6339* (A, US) (gregarious and dominant over a small wet-season swamp in savannah forest). NETHERLANDS NEW GUINEA: Bele River, 18 km. northeast of Lake Habbema, alt. 2200 m., *Brass 11385* (A, US) (covering the moister parts of old garden clearings); Balim River, alt. 1600 m., *Brass 11806* (A, US) (dominant grass on formerly cultivated river flats).

Malaysia to Polynesia.

7a. **Ischaemum digitatum** Brongn. var. **polystachyum** (Presl) Hack. in DC., Monogr. Phan. 6: 233. 1889.

Ischaemum polystachyum Presl, Rel. Haenk. 1: 328. 1830. Type from the Marianas.

Differing from the species in having prominently bearded nodes, the

[20] Fragment from the Berlin Herbarium, with no precise locality, collector's number, or date. The specimen was labeled "*Ischaemum Turneri*" in Hackel's hand.

sheaths densely pilose and the rachis joints and pedicels ciliate with long stiff hairs on the outer angles.

BRITISH NEW GUINEA: Central Division: Urunu, Vanapa Valley, alt. 1900 m., *Brass 4808* (US) (a few plants in small grassland swamps); Mafulu, alt. 1250 m., *Brass 5532* (GH, US) (common in regrowth brush on old garden lands); Gulf Division: Kerema, *Brass 1213* (GH, US) (open grassland near the coast); Northern Division: About 1 mile north of East Embi Lake, *Reeder 845* (A, US) (not common, low ground of grassland). NETHERLANDS NEW GUINEA: Bernhard Camp, Idenburg River, *Brass 13721* (A, US) (occasional in rain-forest seral growths on sandy flood banks). NEW BRITAIN: Talasea, near Waru village, alt. 200 m., *Burcham 140* (US) (sandy loam soil under coconut trees, abundant in this locality).

The Marianas to Malaysia and New Guinea.

Hitchcock (35, p. 126) reported *Brass 4808* and *5532* as *Ischaemum ciliare* Retz., but the second specimen is certainly *I. digitatum*. The identity of the other (*Brass 4808*) cannot be certain, since the plant is infected with a fungus and appears to be abnormal. The specimen is like *I. ciliare* in having only two racemes, but in that species both the pediceled and sessile spikelet have well developed geniculate awns. The Brass specimen has a well developed geniculate awn on the sessile spikelet, but the pediceled spikelet has only a short straight awn. Since the spikelets are those of *I. digitatum*, it seems best to refer the specimen to this species, especially since *I. ciliare* is not otherwise known from New Guinea.

8. **Ischaemum intermedium** Brongn. in Duperry, Bot. Voy. Coquille 73. 1831; Hack., Bot. Jahrb. 13: 261. 1891. Type from the Carolines.

Similar to *I. digitatum* in having 4–6 racemes, but a somewhat smaller species, in which the sessile spikelets have the apex of the first glume acuminate and entire rather than bifid. Both the sessile and pediceled spikelets have a well developed geniculate awn, although that of the sessile spikelet is often larger.

The Carolines to the Moluccas and New Guinea. Also in the Philippines.

Reported from New Guinea, but I have seen no specimen which could be distinguished from *I. digitatum*.

9. **Ischaemum fragile** R. Br., Prodr. Fl. Nov. Holl. 1: 205. 1810; C. E. Hubb., Hook. Ic. 33: *pl. 3263*. 1935; Hitchc., Brittonia 2: 127. 1936. Type from Australia.

Digastrium fragile (R. Br.) A. Camus, Bull. Soc. Bot. France 70: 850. 1923.

Perennial; culms glabrous, 40–110 cm. long, erect or ascending from a geniculate base, 3–7-noded, the nodes often bearded; sheaths keeled, glabrous to more or less pilose; ligule membranous, 2–3 mm. long, tapering to the obtuse, often ciliate apex; blades flat, linear, as much as 20 cm. long, 3–7 mm. wide, acuminate, the base long-attenuate, both surfaces glabrous to more or less densely pubescent, the margins usually scabrous; racemes solitary, 4–6 cm. long, long-exserted when mature; joints of the rachis and pedicels about equal, the pedicel slightly narrower, 3.5–4 mm. long, hemispheric-convex on the back, the inner cavity closed by a thin hyaline membrane, the margins and often the dorsal mid-line pilose; sessile spikelet 5–6 mm. long including the densely bearded callus; first glume emarginate, the upper part with two prominent wings, the lower half smooth and shining, the upper striate; second glume with a short

wing on the upper part of the keel, the apex with an awn 1–3 mm. long; sterile lemma hyaline, its palea firmer and enclosing a staminate flower; fertile lemma deeply cleft and bearing a twisted and geniculate awn from the base of the cleft, the awn 10–18 mm. long; pediceled spikelets reduced, smaller than the sessile, bearing a staminate flower or sometimes reduced to the glumes.

BRITISH NEW GUINEA: Western Division: Dagwa, Oriomo River, alt. 40 m., *Brass 5961* (US) (rare on damp soil on open ridges); Mabaduan, *Brass 6486* (A, US) (common in primary savannah-forest grass cover; most abundant in old garden lands); Lake Daviumbu, Middle Fly River, *Brass 7874* (A, US) (rare on savannahs of this locality), *Brass 7934* (A, US) (rare grass on wet savannahs).

Australia and New Guinea.

33. Apluda L.

Apluda L., Sp. Pl. 82. 1753, Gen. Pl. ed. 5. 35. 1754 (non Beauv. 1812).
Calamina Beauv., Ess. Agrost. 128. *pl. 23, fig. 1.* 1812.

Racemes solitary at the ends of the branches of a leafy open paniculate inflorescence, each partly enclosed in a swollen bract or spathe, reduced to one joint bearing three spikelets, one sessile and perfect, the others borne on flattened glume-like pedicels, one of the pediceled spikelets reduced to a minute flattened glume, the other staminate or neuter (rarely perfect) and as large as the sessile one; sessile spikelet with a thickened rounded callus, the first glume indurated, obtuse, rounded on the back, the margins somewhat inrolled; second glume membranous, gibbous below, the keel depressed above; lower floret staminate, the lemma hyaline, about as long as the glumes, the palea nearly as long, 2-nerved; upper floret perfect, the lemma gibbous on the back, 1-nerved, awnless or short-awned, the palea about half as long; pediceled spikelet similar but both glumes somewhat indurate and the tip of the second glume not depressed. A straggling much branched perennial.

TYPE AND ONLY SPECIES: *Apluda mutica* L.

1. **Apluda mutica** L., Sp. Pl. 82. 1753; F. Muell., Pap. Pl. 1: 46. 1876. Type from India.
Apluda varia Hack. subsp. *mutica* Hack. in DC., Monogr. Phan. 6: 197. 1889.

Culms glabrous, 1–2 meters long, wiry, weak and straggling, decumbent at base, geniculately ascending, usually leaning on other vegetation; sheaths glabrous, usually shorter than the internodes; ligule membranous, 1–2 mm. long; blades scabrous, linear, 10–40 cm. long, 3–10 (rarely to 15) mm. wide, acuminate, the apex often setaceous, the base gradually narrowed into a short petiole; inflorescence narrow, often zig-zag, the axis very slender; spikelets 3–4 mm. long, these and the cymbiform spathes often pruinose.

BRITISH NEW GUINEA: Central Division: Hula, *Brass 522* (GH, US) (damp hollows in coast sandhills); Roana, Laloki River, alt. 450 m., *Brass 3613* (A, US) (rocky savannahs, not plentiful); Mafulu, alt. 1250 m., *Brass 5403* (GH, US) (common, straggling amongst tall *Imperata* on artificial grass slopes); Veiya, *Carr 11741* (NY) (open country); Port Moresby, *MacFarlane 48* (US), *C. T. White 30* (US); Northern Division: Ambasi, *King 1018* (US); about 9 miles northwest of Oro Bay, *Reeder 819* (A, US) (common in grassland); Western Division: Dagwa, Oriomo River, alt. 40 m., *Brass 5957* (GH, US) (growing amongst coarse grasses on an old garden site on open savannah); Daru Island, *Brass*

6431 (A, US) (rare in savannah forests); Lake Daviumbu, Middle Fly River, *Brass 7771* (A, US) (few plants in old village clearing); Goodenough Island: Haiwali, alt. 30 m., *Burcham 119* (US) (two miles inland on coastal plain, grassy clearing in rain forest). NORTHEAST NEW GUINEA: Morobe District: Finschhafen, *Warburg 20968* (A), *Weinland 290* (US); near Kajabit Mission, alt. about 500 m., *Clemens 10631* (US). NETHERLANDS NEW GUINEA: Balim River, alt. 1600 m., *Brass 11798* (A, US) (plentiful subsidiary grass on deforested slopes).

India to China, Formosa, the Philippines, Malaysia, New Guinea, and New Caledonia.

34. Hackelochloa Kuntze

Hackelochloa Kuntze, Rev. Gen. 2: 776. 1891.

Manisuris L. f., Nov. Gram. Gen. 37. 1779 (non L., Mant. 2: 164. 1771).

Rytilix Raf., Bull. Bot. Seringe 1: 219. 1830.[20a]

Spikelets in pairs, dimorphic, awnless, one sessile and perfect, the other pediceled, staminate or neuter; rachis fragile, readily disarticulating, the joints and pedicels firmly grown together, the two clasped between the edges of the coriaceous, subhemispheric, foveolate first glume of the sessile spikelet; second glume chartaceous and set in a cavity in the slightly hollowed out fused rachis joint and pedicel and more or less adnate to it; lemmas hyaline, the lower empty, the upper perfect; pediceled spikelets conspicuous, ovate, the glumes membranous, green. Annuals with freely branching culms, flat blades, and numerous solitary spikelike racemes borne on the ends of slender fascicled spatheate branches.

TYPE SPECIES: *Hackelochloa granularis* (L.) Kuntze (*Cenchrus granularis* L.).

1. **Hackelochloa granularis** (L.) Kuntze, Rev. Gen. 2: 776. 1891; Hitchc., U. S. Dept. Agric. Misc. Publ. 200: 764. *fig. 1689*. 1935, Brittonia 2: 127. 1936.

Cenchrus granularis L., Mant. 2: 575. 1771. Type from India.

Manisuris granularis (L.) L.f., Nov. Gram. Gen. 40. *pl. 1, fig. 4–7*. 1779; Swartz, Prodr. Veg. Ind. Occ. 25. 1788; Beauv., Ess. Agrost. *pl. 21, fig. 10*. 1812; K. Schum., Notizbl. Bot. Gart. Berlin 2: 90. 1898.

Culms more or less decumbent, 20–100 cm. tall, glabrous or sparsely hispid; sheaths rather loose, keeled, papillose-hispid; blades lanceolate-linear, flat, papillose-hispid like the sheaths, 5–15 cm. long, the base more or less cordate; racemes 1–2.5 cm. long, borne on slender peduncles, shortly exserted or the base included in the spathe; sessile spikelets 1–1.5 mm. long, equaling or a little longer than the rachis joints, the pediceled spikelets 1.5–2 mm. long.

BRITISH NEW GUINEA: Central Division: Baroka, Nakeo District, alt. 50 m., *Brass 3701* (A, US) (common in shelter of taller savannah forest); Northern Division: About 8 miles northwest of Oro Bay, *Reeder 806* (A, US) (sandy soil along old jeep road; apparently not common). NORTHEAST NEW GUINEA: Morobe District: *Clemens 4307* (A); near Kajabit Mission, alt. 250–600 m., *Clemens 40782* (US); Wantoat, alt. about 1000 m., *Clemens 40867* (US).

Tropics of both hemispheres.

35. Hemarthria R. Br.

Hemarthria R. Br., Prodr. Fl. Nov. Holl. 1: 207. 1810.

Spikelets paired, 1-flowered, one sessile, the other pediceled, both alike

[20a] Not effectively published. For details see Hitchcock, Contr. U. S. Nat. Herb. 24: 506. 1927, and U. S. Dept. Agric. Bull. 772 (revised): 286. 1936.

or the pediceled spikelets narrower and attenuate, the pedicels appressed to the rachis, usually adnate to it and forming with the hollowed-out rachis joint a cavity containing the sessile spikelet; rachis disarticulating tardily or not at all; first glume coriaceous, dorsally flattened, fitting over the hollow containing the spikelet; second glume cymbiform, membranous-hyaline, more or less adnate to the rachis joint; lemmas hyaline, the lower empty, the upper (fertile) awnless, usually with a small palea; pediceled spikelet acuminate or attenuate, both glumes coriaceous, the second usually longer than the first, free, the apex attenuate or awn-pointed. Perennials with mostly decumbent culms and terminal spikelike racemes solitary on the culms and branches.

TYPE SPECIES: *Hemarthria compressa* (L. f.) R. Br. (*Rottboellia compressa* L. f.).

1. **Hemarthria subulata** sp. nov. PLATE V, *Figs. c-e.*

Probabiliter perennis; culmis compressis glabris erectis, ramosis, 1–1.5 m. altis; nodis 4–6; vaginis glabris plus minusve laxis, supra quam internodiis brevioribus, eis infra medium culmi plerumque quam internodiis longioribus; ligula ciliata, circiter 1 mm. longa; laminis linearibus, laxis, ad 60 cm. longis, 2–4 mm. latis, utrinsecus glabris, marginibus scabris; racemis solitariis, gracilibus, 10–20 cm. longis, rhachi tenaci sed denique plus minusve disjuncta, articula infra spiculam longe acuminato-cuspidata; spicula sessili hermaphrodita, articula aequali vel paullo breviore; gluma prima indurata, acuta, 7-nervia; gluma secunda articula plus minusve adnata, membranaceo-scariosa; lemmatibus subaequalibus; lemmate sterili quam glumis circiter quarte parte breviore, palea sterili nulla; lemmate fertili quam lemmate sterili saepe paullo breviore, palea fertili quam lemmate quarta vel tertia parte breviore; staminibus 3, antheris circiter 4 mm. longis; spicula pedicellata acuminata, quam spicula sessili angustiore, ceterum simili, pedicellis articulis saepius laxiuscule adnatis rarius liberis, spicula sessili circiter aequali; glumis induratis, prima dorso complanata, secunda cymbiformi, carinata, carina anguste alata, ceterum spicula sessili simili.

BRITISH NEW GUINEA: Western Division: Lake Daviumbu, Middle Fly River, *Brass 7552* (A, US, TYPE) August, 1936 (in savannahs, common on margins of swamps); Dagwa, Oriomo River, *Brass 6001* (GH, US) (rare grass on a small marshy flat).

Apparently closely related to *Hemarthria protensa* Nees ex Steud., but differing in having stiffly erect rather than decumbent culms, much longer and narrower blades with scabrous margins, a disarticulating rachis, the first glume 7-nerved, and the fertile lemma well developed rather than obsolete or only about one-fourth the length of the spikelet. *Brass 6001* was reported as *Manisuris protensa* (Nees ex Steud.) Hitchc. (*H. protensa* Nees ex Steud.) by Hitchcock (35, p. 127).

36. **Eremochloa** Buse

Eremochloa Buse in Miquel, Pl. Jungh. 1: 357. 1854.
Pectinaria Hack., Nat. Pflanzenfam. II. 2: 26. 1887.

Spikelets appearing solitary at each node, but actually paired, only the sessile developing, the pediceled reduced to a glume-like or stipiform

pedicel; sessile spikelets dorsally compressed, awnless, imbricate along one side of a tardily disarticulating rachis; glumes chartaceous, the first broad, flat or only slightly rounded on the back, the margins narrowly inflexed, 2-keeled, the keels spinulose or rigidly pectinate, at least on the lower part; second glume 3-nerved, the midnerve sometimes keeled; lemmas hyaline, the lower 3-nerved, triandrous, the palea similar; fertile lemma entire, usually nerveless, the palea similar but narrower. Slender perennials with solitary terminal racemes.

TYPE SPECIES: *Eremochloa Horneri* Buse = *E. ciliaris* (L.) Merr. (*Nardus ciliaris* L.).

KEY TO THE SPECIES

1. First glume wingless at summit, the marginal setae longer than the width of the glume.....1. *E. ciliaris.*
1. First glume with short narrow wings just below the summit, the marginal setae usually shorter than the width of the glume.....2. *E. bimaculata.*

1. **Eremochloa ciliaris** (L.) Merr., Philip. Jour. Sci. 1: Suppl. 331. 1906; Ohwi, Bot. Mag. (Tokyo) 56: 11. 1942.
Nardus ciliaris L., Sp. Pl. 53. 1753. Type from India.
India to China, the Philippines, and (?) New Guinea.

1a. **Eremochloa ciliaris** (L.) Merr. var. **elata** var. nov.

A typo culmis multo altioribus, laminis longioribus et rigidioribus arcte conduplicatis differt.

Culms erect, strongly flattened, 4–5-noded, glabrous to more or less pubescent, 75–110 cm. tall, branching from the middle and upper nodes; sheaths glabrous, shorter than the internodes, strongly keeled; ligule membranous, truncate, 0.5–1 mm. long; blades erect, firm, closely folded, as much as 25 cm. long, 3–6 mm. wide opened out; racemes 3–5 cm. long, straight or falcate; rachis joints clavate, about 2 mm. long, with a ring of short cilia at the base, otherwise glabrous; spikelets ovate, 4–5 mm. long; first glume glabrous or minutely pubescent, keels not winged, the setae more or less scabrous, longer than the width of the spikelet; sterile pedicel narrow, one-third to half as long as the spikelet.

BRITISH NEW GUINEA: Western Division: Lake Daviumbu, Middle Fly River, *Brass 7808* (A, TYPE, US) Sept., 1936 (probably a rare glaucous form of the common *7849*), *Brass 7849* (A, US) (common on hummocks on wet grass plains).

Differs from the species in being much taller and having longer and firmer, closely folded blades.

2. **Eremochloa bimaculata** Hack. in DC., Monogr. Phan. 6: 265. 1889; Chase, Jour. Arnold Arb. 20: 314. 1939. Type from India.

Culms simple, slender, strongly flattened, tufted, 40–60 cm. tall, glabrous or sparsely pubescent; sheaths shorter than the internodes, rather densely papillose-pilose, the upper bearing reduced blades; ligule membranous, about 0.3 mm. long; blades 8–13 cm. long, 2–3 mm. wide, flat, flaccid, glabrous or more or less densely papillose-pilose; racemes 3.5–5 cm. long, the rachis undulate, the joints clavate, about half as long as the spikelets; spikelets ovate, 4–5 mm. long, the first glume glabrous or minutely pubescent on the back, the keels with short narrow brownish wings just below the apex, the setae widely spreading, mostly shorter than the width of

the glume; sterile pedicel about one-third shorter than the spikelet, abruptly acuminate, broadest in the middle.

BRITISH NEW GUINEA: Western Division: Wuroi, Oriomo River, *Brass 5743* (A, US) (common on grey soil of savannah ridges); Tarara, Wassi Kussa River, *Brass 8408* (A, US) (common in savannah forests).

India to Australia and New Guinea.

The cited specimens differ from Hackel's original description in having the nodes glabrous or only slightly pubescent and the blades more or less densely papillose-pilose rather than glabrous. In other respects they agree well with both the description and a fragment of the type specimen (at US). The short narrow wings just below the tip of the first glume are distinctive. *Brass 5743* was reported by Hitchcock (35, p. 127) as *Eremochloa ciliaris*, a closely related species having culms often branching from the upper and middle nodes and the first glume not winged.

37. **Elyonurus** Humb. & Bonpl. ex Willd.

Elyonurus Humb. & Bonpl. ex Willd., Sp. Pl. 4: 941. 1806.

Spikelets strongly dorsally flattened, awnless, in pairs, one sessile and perfect, the other pediceled, similar to the sessile or (in ours) much reduced, the pair falling attached to the rachis joint; rachis usually somewhat tardily disarticulating, breaking obliquely and forming a sharp-pointed callus; rachis joints and pedicels somewhat thickened, parallel, the rachis joint concave within and with the sessile spikelet appressed to it; first glume chartaceous to weakly coriaceous, dorsally flattened and with a line of balsam glands just inside the keels, the margins inflexed around the second glume, acute or acuminate, entire or bifid with aristate teeth; second glume chartaceous, weakly keeled on the back, the apex acuminate; lemmas hyaline, the palea much reduced or wanting. Erect moderately tall perennials with solitary, spikelike, often woolly racemes.

TYPE SPECIES: *Elyonurus tripsacoides* Humb. & Bonpl.

1. **Elyonurus citreus** (R. Br.) Munro ex Benth., Fl. Austral. 7: 510. 1878; White, Proc. Roy. Soc. Queensl. 34: 15. 1923; Hitchc., Proc. Linn. Soc. N. S. Wales 54: 145. 1929.

   Andropogon citreus R. Br., Prodr. Fl. Nov. Holl. 1: 203. 1810. Type from Australia.

   ? *Elyonurus papuanus* Lauterb. & K. Schum. in K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 171. 1901. Type from Northeast New Guinea.

Culms tufted, glabrous, slender, 50–100 cm. tall, with floriferous branches from the upper one or two nodes; sheaths shorter than the internodes, glabrous to very sparsely pubescent, often more or less pilose in the throat; ligule ciliate, about 1 mm. long; blades 10–20 cm. long, involute, subfiliform, rigid, glabrous; racemes solitary on the culms and branches, 5–8 cm. long, silky-woolly from the spreading hairs on the rachis and pedicels; rachis joints 5–6 mm. long, the white hairs on the upper part 3–4 mm. long; pedicel about equal and with similar hairs; sessile spikelet 10–13 mm. long including the 2–3 mm. long, bearded callus; first glume very slightly convex on the back, glabrous or more or less pilose, the acuminate apex about as long as the body and split into two long flattened aristate teeth, the margins of the glume and the teeth pectinate with stiff hairs

as much as 1 mm. long; second glume about half as long as the first, keeled on the back, acuminate; pediceled spikelets shorter and narrower than the sessile, reduced to a pair of aristate empty glumes, the second about one-fourth shorter than the first, one margin of the first glume prominently pectinate, the other short-pectinate or merely scabrous.

BRITISH NEW GUINEA: Eastern Division: Kurandi, *Brass 1397* (GH, US) (on old garden clearings); Western Division: Lake Daviumbu, Middle Fly River, *Brass 7920* (A, US) (gregarious in small clumps on hard pebbly soil in savannahs).

Australia and New Guinea.

The type of *Elyonurus papuanus* has not been seen, but from the description it appears to be a synonym of *E. citreus*.

38. Rottboellia L.f.

Rottboellia L. f., Nov. Gram. Gen. 22. *pl. 1.* 1779 (non Scop. 1777). Nom. conserv.
Stegosia Lour., Fl. Cochinch. 51. 1790.

Spikelets paired, awnless, one sessile and perfect, usually sunken in the cavities of the thickened articulate rachis, the other pediceled and staminate or sometimes rudimentary, the pedicels free or closely appressed to the rachis joints; joints of the rachis with a projection on the lower end fitting into a corresponding cavity in the upper end of the next lower joint; glumes coriaceous or chartaceo-membranous, the first dorsally convex or flattened, the second cymbiform, sometimes gibbous on the back; lemmas hyaline or thinly membranous, the lower staminate or neuter, the fertile 1–3-nerved and with a subequal palea. Annuals or perennials with usually stout readily disarticulating spikelike racemes solitary or fascicled in the axils of spatheate sheaths.

TYPE SPECIES: *Rottboellia exaltata* L. f.

KEY TO THE SPECIES

1. Pedicels flattened, very unlike the hollowed out rachis joint; sessile spikelets about 5 mm. long.....1. *R. exaltata.*
1. Pedicels similar to the rachis joints but slightly shorter, both subclavate; sessile spikelets 3–4 mm. long.....2. *R. rottboellioides.*

1. **Rottboellia exaltata** L. f., Nov. Gram. Gen. 22. *pl. 1.* 1779, Suppl. Pl. 114. 1781; Chase, Jour. Arnold Arb. 20: 314. 1939; C. E. Hubb. & Vaughan, Grass. Maurit. & Rodriguez 117. *fig. 16.* 1940. Type from India.
Manisuris exaltata (L. f.) Kuntze, Rev. Gen. 2: 779. 1891.
Stegosia exaltata (L. f.) Nash, N. Am. Fl. 17: 84. 1909.

Annual; culms erect, stout, branching, 60–200 cm. tall, glabrous or hispid below, often glaucous below the raceme; sheaths rather loose, usually densely papillose-hispid; ligule membranous, short-ciliate, about 1.5 mm. long; blades flat, linear-lanceolate, 15–50 cm. long, 5–25 mm. wide, often glaucous beneath, the margins serrulate-scabrous; racemes 8–15 cm. long, stout below and attenuate with imperfect spikelets above, scaberulous, often pale yellow except for the greenish first glume of the pediceled spikelets; joints of the rachis slightly longer than the sessile spikelets, hollowed out and the spikelet borne in the hollows; first glume about 5 mm. long, strongly indurated, emarginate, the second strongly gibbous

on the back; pediceled spikelet 3–4.5 mm. long, the pedicel somewhat flattened, about half as long as the rachis joint and closely appressed to it; first glume striate, green, obtuse or emarginate.

BRITISH NEW GUINEA: Western Division: Daru Island, *Brass 6296* (A, US) (plentiful and forming dense brakes on wet garden land behind mangroves).

Tropics of both hemispheres.

2. **Rottboellia rottboellioides** (R. Br.) comb. nov.

Ischaemum rottboellioides R. Br., Prodr. Fl. Nov. Holl. 1: 205. 1810. Type from Australia.

Andropogon rottboellioides (R. Br.) Steud., Syn. Pl. Glum. 1: 382. 1854.

Rottboellia ophiuroides Benth., Fl. Austral. 7: 514. 1878; K. Schum. & Hollr., Fl. Kais. Wilhelmsland 22. 1889. Based on *Ischaemum rottboellioides* R. Br.

Manisuris rottboellioides (R. Br.) Kuntze, Rev. Gen. 2: 779. 1891; Hitchc., Brittonia 2: 127. 1936.

Coelorachis rottboellioides (R. Br.) A. Camus, Ann. Soc. Linn. Lyon 68: 197. 1921.

Perennial; culms glabrous, subrobust, 1–2 meters tall; sheaths rather firm, glabrous or rarely somewhat short-pubescent, usually pubescent on the collar; ligule membranous, ciliate, 1–2 mm. long; blades 25–50 cm. long, 8–20 mm. wide, both surfaces glabrous (rarely more or less short pubescent), the margins serrulate-scabrous; racemes 6–8 cm. long, terminal on slender fascicled spatheate branches; joints of the rachis about one-fourth shorter than the sessile spikelets, subclavate, slightly keeled on the back, the inside somewhat concave; pedicels similar but slightly shorter, free from the rachis joint; sessile spikelet 3–4 mm. long; glumes coriaceous, glabrous, the first ovate-oblong, emarginate, the keels narrowly winged, often unequally so; second glume cymbiform, keeled on the back, the keel narrowly winged toward the apex; pediceled spikelets similar to the sessile, usually smaller, rarely as large or reduced to a pair of narrow glumes.

BRITISH NEW GUINEA: Central Division: Budotobara, *Brass 776* (GH, US) (large savannah grass); Baroka, Nakeo District, alt. 50 m., *Brass 3702* (GH, US) (scattered amongst the dominant *Anthistiria* [*Themeda*] on savannah forest ridges); Mafulu, alt. 1250 m., *Brass 5310* (GH, US) (on artificial grasslands); Gosaro, Rigo District, *MacGregor 19* (US); Western Division: Daru Island, *Brass 6254* (A, US) (abundant in savannah forest and in some moist shaded situations the dominant grass); Gaima, Lower Fly River, *Brass 8254* (A, US) (dominant grass on savannah forests); Northern Division: About 9 miles northwest of Oro Bay, *Reeder* 809 (A)[21] (conspicuous constituent of the grassland); Goodenough Island: Haiwali village, *Burcham 124* (US) (grassy clearing in rain-forest, appears to grow mainly in full sun). NORTHEAST NEW GUINEA: Morobe District: Four miles south of Langemak Bay, near Finschhafen, *Sawyer 51* (A).

Australia and New Guinea.

39. **Thaumastochloa** C. E. Hubb.

Thaumastochloa C. E. Hubb., Hook. Ic. 34: *pl. 3313, 3314.* 1936.

Spikelets awnless, solitary at each node, all facing in the same direction; pediceled spikelets wanting or reduced to a minute glume, the pedicel firmly adnate to the rachis joint and forming with it a semicylindrical internode

[21] This collection consists of a mixture, the specimen at the U. S. National Herbarium being *Ophiurus exaltatus*.

hollowed out within and with the first glume fitting tightly over the hollow containing the spikelet; racemes subcylindric-flattened, terminal, single or fascicled, consisting of 1 or 2 or a greater number of spikelets, these asymmetrical with the tips pointing in opposite directions, the peduncle gradually thickened upward and merging into the lowest rachis joint; first glume coriaceous, smooth or rugose on the back, the margins often inrolled; second glume cymbiform, membranous, 3–5-nerved; lemmas hyaline, the lower epaleate and empty; fertile lemma with a similar narrow palea and a perfect flower. Annuals or perennials with usually short slender somewhat flattened spikelike racemes and slender branching culms.

TYPE SPECIES: *Thaumastochloa pubescens* (Domin) C. E. Hubb. (*Ophiuros pubescens* Domin).

1. **Thaumastochloa rariflora** (F. M. Bailey) C. E. Hubb., Hook. Ic. 34: *pl. 3313.* 1936; Chase, Jour. Arnold Arb. 20: 314. 1939.

Rottboellia rariflora F. M. Bailey, Queensl. Dept. Agric. Bot. Bull. 8: 86. 1893. Type from Australia.

Annual; culms slender, geniculately ascending to erect, 10–60 cm. tall, the nodes pubescent to glabrous; sheaths much shorter than the internodes, keeled above, more or less densely pilose, the hairs often papillose-based; ligule membranous, ciliate, about 0.2 mm. long; blades flat or involute in drying, 2–10 cm. long, 2–4 mm. wide; racemes dorsally compressed, bearing one or two spikelets, solitary or fascicled and more or less included in the sheaths; peduncle 0.5–2.5 cm. long, the lower part tapering to a very slender base, becoming curved and readily disarticulating; rachis fragile, disarticulating horizontally, the 1 or 2 rachis joints smooth, glabrous, 2.5–3 mm. long, the upper terminating in a blunt apex scarcely exceeding the spikelet or in an acumen 1–6 mm. long; first glume dorsally flattened to slightly concave, granular-punctate, 9-nerved within, the margins minutely pubescent at the base; second glume 3–5-nerved, the upper margins very minutely ciliolate; remainder of the spikelet as in the generic description.

BRITISH NEW GUINEA: Western Division: Wuroi, Oriomo River, alt. 30 m., *Brass 6014* (GH, US) (uncommon on grey soil on savannah ridge); Mabaduan, *Brass 6554* (A, US) (occasional under the dominant *Themeda triandra* in savannah forests).

Australia and New Guinea.

The cited specimens differ from Hubbard's description and illustration, and from the one Australian specimen seen, in having the apex of the upper rachis joint terminating in a blunt point rather than in an acumen 1–6 mm. long. In other respects they seem identical. *Brass 6014* was cited as *Ophiuros pubescens* Domin [*Thaumastochloa pubescens* (Domin) C. E. Hubb.] by Hitchcock (35, p. 128), but in that species the raceme is composed of 4–9 spikelets in which the first glume is dorsally foveolate-tuberculate to transversely rugose.

40. **Ophiuros** Gaertn. f.

Ophiuros Gaertn. f., Suppl. Carpol. (Fruct. & Sem. 3) 3. *pl. 181, fig. 3.* 1805, pro parte.

Spikelets awnless, solitary at each node, distichous, the pediceled spike-

lets wanting, the pedicel firmly adnate to the rachis joint and forming with it a thick semi-cylindrical internode deeply hollowed out within, the first glume fitting tightly over the hollow containing the spikelet; first glume coriaceous, convex on the back and with a small groove at the base just above the narrow circular callus; second glume cymbiform, chartaceous; lemmas hyaline, as long as the spikelet, the first with a well developed palea and usually a staminate flower; fertile lemma with a similar palea and a perfect flower. Tall, coarse perennials with flat blades and smooth slender, spikelike, solitary racemes.

TYPE SPECIES: *Ophiuros corymbosus* (L. f.) Gaertn. f. = *O. exaltatus* (L.) Kuntze (*Aegilops exaltata* L.).

1. **Ophiuros exaltatus** (L.) Kuntze, Rev. Gen. 2: 780. 1891; Hitchc., Brittonia 2: 127. 1936.

Aegilops exaltata L., Mant. app. 575. 1771. Type from India.

Rottboellia corymbosa L. f., Suppl. Pl. 114. 1781. Type from India.

Ophiuros corymbosus (L. f.) Gaertn. f., Suppl. Carpol. (Fruct. & Sem. 3) 3–4. *pl. 181, fig. 3B.* 1805; Blatter & McCann, Imp. Council Agric. Res. Sci. Monogr. 5: 40. *pl. 28.* 1935.

Culms glabrous, subrobust, erect from more or less bulbous bases, 1–2 meters tall, with floriferous branches from the upper 2 or 3 nodes; lower sheaths glabrous, the upper often pilose on the margins and more or less dorsally papillose-hispid; blades linear to linear-lanceolate, as much as 60 cm. long, 8–25 mm. wide, rounded or subcordate at base, the margins often papillose-hispid; racemes 6–15 cm. long, about 1.5 mm. in diameter, solitary on slender fascicled branches, these more or less included in the sheaths of the upper leaves; rachis fragile, the joints about 3 mm. long, both ends obliquely truncate, the upper concave, the lower with a small projection which fits into the top of the joint below; first glume ovate-oblong, the dorsal surface smooth or more or less foveolate with 2–4 rows of small depressions, the remainder of the spikelet as in the generic description.

BRITISH NEW GUINEA: Central Division: Rona, Laloki River, alt. 450 m., *Brass 3586* (GH, US) (fairly common in *Eucalyptus* savannahs); Baroka, Nakeo District, alt. 50 m., *Brass 3724* (GH, US) (common in *Eucalyptus* savannah ridges); Kanosia, alt. about 30 m., *Carr 11134* (NY) (open savannah land); Western Division: Wuroi, Oriomo River, alt. 10–30 m., *Brass 5735* (GH, US) (scattered on savannah ridges); Mabaduan, *Brass 6537* (A, US) (fairly common in grass cover of savannah forests); Lake Daviumbu, Middle Fly River, *Brass 7643* (A, US) (open savannah); Northern Division: About 9 miles northwest of Oro Bay, *Reeder 809* (US)[22] (common constituent of the grassland). NORTHEAST NEW GUINEA: Morobe District: Markham Valley, Kajabit, *Clemens 40838* (US); Finschhafen, *Weinland 266* (US).

41. Sorghum Moench

Sorghum Moench, Meth. Pl. 207. 1794.

Holcus L., Sp. Pl. 1047. 1753, pro parte.

Spikelets in pairs or in threes at the ends of the branches, one sessile and fertile, the other pediceled, staminate or neuter, sometimes reduced to a single narrow glume; sessile spikelet dorsally compressed; glumes

[22] This collection consists of a mixture, the specimen at the Arnold Arboretum being *Rottboellia rottboellioides*.

firmly coriaceous, the first rounded on the back or flattened, the margins involute, not keeled; second glume somewhat cymbiform but rounded on the back, not or only slightly keeled; lemmas hyaline or thinly membranous, the lower empty, the upper (fertile) oblong, bifid and awned from the sinus, or entire and awnless. Annuals or perennials with terminal panicles of numerous 1–5-jointed racemes.

TYPE SPECIES: *Sorghum saccharatum* (L.) Moench (*Holcus saccharatus* L. pro parte) = *Sorghum dochna* (Forsk.) Snowden.

KEY TO THE SPECIES

1. Panicle branches in whorls; pediceled spikelet staminate; hairs of the inflorescence brown.....1. *S. nitidum*.
1. Panicle branches solitary or in twos or threes; pediceled spikelet reduced to a narrow glume; hairs of the inflorescence white.....2. *S. laxiflorum*.

1. **Sorghum nitidum** (Vahl) Pers., Syn. Pl. 1: 101. 1805; Hitchc., Brittonia 2: 129. 1936.

Andropogon serratus Thunb., Fl. Jap. 41. 1784. Type from Japan.
Holcus nitidus Vahl, Symb. Bot. 2: 102. 1791. Type from India.
Holcus fulvus R. Br., Prodr. Fl. Nov. Holl. 1: 199. 1810. Type from Australia.
Sorghum fulvum (R. Br.) Beauv., Ess. Agrost. 164. 1812; White, Proc. Roy. Soc. Queensl. 34: 15. 1923.
Andropogon tropicus Spreng., Syst. Veg. 1: 287. 1825; Kunth, Rev. Gram. 1: *pl.* 97. 1829. Based on *Holcus fulvus* R. Br.
Sorghum tropicum (Spreng.) Buse in Miquel, Pl. Jungh. 359. 1854.
Sorghum serratum (Thunb.) Kuntze, Rev. Gen. 2: 792. 1891 (non Roem. & Schult. 1817).

Perennial; culms erect or ascending, 60–100 cm. tall, often decumbent, rooting and branching from the lower nodes; nodes densely bearded; sheaths mostly shorter than the internodes, glabrous or sometimes pubescent; ligule membranous, 1.5–2.5 mm. long, ciliolate; blades flat, linear, as much as 50 cm. long, 4–11 mm. wide, glabrous and smooth except for the scabrous margins; panicle oblong, 10–30 cm. long, the slender branches verticillate, naked below, simple and bearing a single terminal raceme (rarely the lower branches once or twice branched); racemes 1–2 cm. long, the rachis joints and pedicels ciliate with brown hairs, the pedicel shorter than the sessile spikelet, the rachis joint from equal to more than twice as long; sessile spikelet ovate to ovate-lanceolate, 3–4 mm. long, brownish or finally shining black, pubescent with brown hairs, awnless or with a twisted and geniculate awn 10–15 mm. long; pediceled spikelets staminate, of about the same size as the sessile, but the glumes membranous or chartaceous and lighter in color.

BRITISH NEW GUINEA: Central Division: Kanosia, *Carr 11111* (US) (open savannah land); *Carr 11135* (NY) (open savannah land); Roana, Laloki River, alt. 450 m., *Brass 3629* (GH, US) (common species growing sporadically all through the savannahs); Western Division: Wuroi, Oriomo River, *Brass 5895* (GH, US) (among *Imperata cylindrica* in savannah forest); Daru Island, *Brass 6252* (A, US) (abundant in tall grass ground cover of savannah forest); Lake Daviumbu, Middle Fly River, *Brass 7644* (A, US) (occasional in savannahs); Gaima, Lower Fly River, *Brass 8263* (A, US) (common in savannah forest grass cover); Tarara, Wassi Kussa River, *Brass 8567* (A, US) (savannah forest; associated with *Imperata* on well drained soils); Northern Division: About 9 miles northwest of Oro Bay, *Reeder 808* (A, US) (common on grassland); Goodenough

Island: Haiwali village, *Burcham 121* (US) (grassy clearing in rain-forest). NORTHEAST NEW GUINEA: Morobe District: Kajabit Mission, *Clemens 10665* (US); Finschhafen, *Weinland 281* (US). NETHERLANDS NEW GUINEA: West of Hollandia, *Sigafoos 68* (A); Balim River, alt. 1600 m., *Brass 11618* (A, US) (one of principal grasses on sandy deforested slopes). NEW BRITAIN: *Parkinson 45* (US).

India to Japan, Malaysia, and Australia.

All the cited specimens except *Brass 11618* and *Parkinson 45* are awnless. In the former, only part of the spikelets of the panicle are awned.

2. **Sorghum laxiflorum** F. M. Bailey, Rep. Exped. Bellenden. 70. 1889, Syn. Queensl. Fl. Suppl. 3: 84. 1890, Comp. Cat. Queensl. Pl. 620. *fig. 595*. 1909. Type from Australia.

Andropogon Baileyi F. Muell., Vict. Nat. 8: 16. 1891. Based on *Sorghum laxiflorum* F. M. Bailey.

Andropogon Sorghum (L.) Brot. subsp. *halepensis* (L.) Hack. var. *albovillosa* Lauterb. & K. Schum. in K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 173. 1901. Type from Northeast New Guinea.

Annual; culms weak, freely branching, decumbent below and rooting from the lower nodes, ascending to 1.5 meters, pubescent below the panicle, otherwise glabrous except for the short bearded nodes; sheaths mostly shorter than the internodes, more or less ciliate on the margins, otherwise glabrous; ligule membranous, about 1 mm. long, minutely ciliolate; blades linear, rather firm, flat or folded, the margins sometimes revolute, as much as 70 cm. long, 4–10 mm. wide, the apex long-attenuate, glabrous below, the upper surface and margins scabrous to hispid; panicle 15–20 cm. long, the slender lax branches solitary or in twos or threes at the nodes of the axis, bearing 2 to several capillary branchlets each with 1–3 pairs of spikelets toward their tips; rachis joints and pedicels slender, about equal, shorter than the sessile spikelets, white-ciliate on the margins; sessile spikelets about 5 mm. long, narrowly oblong, toward the apex abruptly narrowed into a neck about 1 mm. long; glumes coriaceous, dark brown when mature, the callus and dorsal surface pilose with white hairs; second glume glabrous or only slightly pilose; awn of the fertile lemma 3–4 cm. long, geniculate below the middle, the column dark brown, shining, the margins short-stiff-pubescent with white hairs; pediceled spikelets reduced to one membranous, narrow to subulate glume about 3 mm. long.

BRITISH NEW GUINEA: Northern Division: About 3 miles south of Dobodura, *Reeder 822* (US) (growing on edge of jungle). NORTHEAST NEW GUINEA: Morobe District: Salamaua, *Clemens 34* (A) (trail bank, hill near beach); Malshang, near Lae, *Clemens 10441* (US); Wantoat, *Clemens 10980, 41090* (US).

Australia to New Guinea and the Philippines.

42. Chrysopogon Trin.

Chrysopogon Trin., Fund. Agrost. 187. 1820. Nom. conserv.

Rhaphis Lour., Fl. Cochinch. 2: 552. 1790.

Pollinia Spreng., Pl. Pugill. 2: 10. 1815 (non Trin. 1832).

Spikelets mostly in threes at the ends of the panicle branches and branchlets, one sessile and perfect, two pediceled and staminate or neuter, the group falling together, rarely the spikelets in pairs on a 2–4-jointed rachis, but then the spikelets in threes at the ends of the branches; sessile spikelets disarticulating obliquely and forming a more or less elongate sharp-

pointed callus, the callus usually bearded at least on the margins; first glume involute, rounded on the back, keeled upward, the keels usually spiny-hispid; second glume cymbiform, keeled toward the apex and usually aristate; lemmas hyaline, the first 2-nerved, empty; fertile lemma narrow, entire or bidentate, bearing a straight or geniculate awn; pediceled spikelets awnless or with a short straight awn, the glumes of thinner texture than those of the sessile spikelets. Perennials (ours) with terminal strict or rather loose panicles.

TYPE SPECIES: *Chrysopogon Gryllus* (L.) Trin. (*Andropogon Gryllus* L.).

KEY TO THE SPECIES

1. Racemes 2–4-jointed; culms erect, 1–2 meters tall.
   2. Sessile spikelets (including the callus) 5–7 mm. long; callus up to 2 mm. long, white-bearded; racemes longer than the panicle branches.....2. *C. elongatus.*
   2. Sessile spikelets (including the callus) 8–10 mm. long; callus up to 4 mm. long, tawny-bearded; racemes, or many of them, shorter than the panicle branches.. .....3. *C. filipes.*
1. Racemes reduced to a triad of 1 sessile and 2 pediceled spikelets at the ends of the panicle branches; plants with rhizomes or stolons, the culms ascending to 20–60 cm.....1. *C. aciculatus.*

1. **Chrysopogon aciculatus** (Retz.) Trin., Fund. Agrost. 188. 1820; White, Proc. Roy. Soc. Queensl. 34: 15. 1923.

   Andropogon aciculatus Retz., Obs. Bot. 5: 22. 1789; K. Schum., Bot. Jahrb. 9: 197. 1887. Type from India.

   Rhaphis trivialis Lour., Fl. Cochinch. 2: 553. 1790; Trin., Sp. Gram. Ic. 1: *pl. 8.* 1830. Type from Cochinchina.

   Andropogon acicularis Willd., Sp. Pl. 4: 906. 1806. Based on *A. aciculatus* Retz.

   Rhaphis acicularis Desv., Opusc. 69. 1831; Hitchc., Mem. Bishop Mus. 8: 219. *fig. 107.* 1922; Chase, Jour. Arnold Arb. 20: 315. 1939.[23] Based on *A. aciculatus* Retz.

   Rhaphis aciculatus (Retz.) Honda, Bot. Mag. (Tokyo) 40: 103. 1926; Pilger, Nat. Pflanzenfam. ed. 2. 14e: 153. *fig. 82.* 1940.

Culms ascending from stout creeping rhizomes and stolons, 20–60 cm. tall; leaves densely imbricate on the rhizomes and stolons, distant on the flowering culms; sheaths terete, glabrous or sparingly bearded at the throat, the margins more or less ciliate, the culm sheaths shorter than the internodes; ligule minutely ciliolate; blades flat, rounded at the base, obtuse or subacute at the tips, 2–15 cm. long, 3–5 mm. wide, both sides glabrous or sparsely pilose at the base, the margins sparingly spinulose; panicle long-exserted, linear-oblong, usually purplish, 5–10 cm. long, the filiform branches in whorls of 4–9, about 1 cm. long or less; racemes reduced to a triad of one sessile and two pediceled spikelets; sessile spikelet linear, acuminate from about the middle, about 4 mm. long and with a long sharp rusty-bearded callus 4–6 mm. long, the callus formed by an oblique splitting of the pedicel entirely to the base of the spikelet; first glume spinulose toward the subtruncate or bimucronulate apex; second glume acuminate or aristate, the awn as much as 3 mm. long; fertile lemma entire, with a straight terminal awn 4–7 mm. long; pediceled spikelets 5–6 mm. long, the slender glabrous pedicels 2–3 mm. long.

23 Hitchcock and Chase give the binomial as "*Rhaphis aciculata* (Retz.) Desv." but Desvaux spelled the specific name "*acicularis.*"

BRITISH NEW GUINEA: Central Division: Kanosia, *Carr 11033* (US, NY) (open places); Western Division: Daru Island, *Brass 6426* (A, US) (very troublesome weed on roadsides and town allotments); Northern Division: About 9 miles northwest of Oro Bay, *Reeder 812* (A, US) (frequent in the open in wet places); Goodenough Island: Haiwali village, *Burcham 136* (US) (in vicinity of abandoned native village, mostly about bases of coconuts). NORTHEAST NEW GUINEA: Morobe District: 4 miles south of Langemak Bay, near Finschhafen, *Sawyer 144, 163* (A).

Tropical Asia to Australia, New Guinea, and Polynesia.

2. **Chrysopogon elongatus** (R. Br.) Benth., Fl. Austral. 8: 538. 1878.

Holcus elongatus R. Br., Prodr. Fl. Nov. Holl. 1: 200. 1810. Type from Australia.

Rhaphis elongatus (R. Br.) Chase, Contr. U. S. Nat. Herb. 24: 205. 1925; Hitchc. Brittonia 2: 129. 1936.

Vetiveria elongata (R. Br.) Stapf ex C. E. Hubb., Kew Bull. 1934: 444. 1934.

Culms erect, 1–2.5 meters tall, glabrous, about 7-noded; sheaths mostly longer than the internodes, glabrous or somewhat scabrous; ligule reduced to an even row of short white hairs about 0.2 mm. long; blades long-attenuate, folded for a considerable distance, as much as 50 cm. long, to 8 mm. wide, spinulose-scabrous on the margins and midrib below, otherwise glabrous and smooth, the upper surface with scattered short tubercle-based hairs; panicle pale to purplish, contracted, rather dense, 15–35 cm. long, the branches slender, rather stiff, as much as 4 cm. long; racemes 2–4-jointed, the joints 3–4 mm. long; peduncles 2–3 mm. long; sessile spikelet linear-lanceolate or linear, 5–7 mm. long including the 1.5–2 mm. long callus; the callus bearded on the margin with white or whitish hairs to 3 mm. long; glumes coriaceous, the first acute, spinulose-scabrous on the keels, the second cymbiform, mucronate or aristate with an awn as much as 2 mm. long, keeled upward, the keel spinulose-scabrous; fertile lemma with an awn as much as 12 mm. long, twisted and weakly geniculate below; pediceled spikelets slightly longer than the sessile, the glumes less firm.

BRITISH NEW GUINEA: Western Division: Daru Island, *Brass 6045* (GH, US) (heavy wet soil close behind mangrove fringe), *6283* (A, US) (pure stands on damp soils bordering large swamp); Wassi Kussa River, *Brass 8579* (A, US) (covering small tidal flats at rear of mangrove fringe); *MacGregor 46* (US).

Australia and New Guinea.

Brass 8579 was reported as *Vetiveria filipes* (Benth.) C. E. Hubb. [*Chrysopogon filipes* (Benth.) Reeder] by Chase (17, p. 315), but that species has longer panicle branches and much larger spikelets.

3. **Chrysopogon filipes** (Benth.) comb. nov.

Chrysopogon elongatus (R. Br.) Benth. var. *filipes* Benth., Fl. Austral. 7: 539. 1878. Type from Australia.

Andropogon elongatus (R. Br.) Spreng. var. *filipes* (Benth.) Hack. in DC., Monogr. Phan. 6: 565. 1889.

Vetiveria filipes (Benth.) C. E. Hubb., Kew Bull. 1934: 444. 1934.

3a. **Chrysopogon filipes** (Benth.) Reeder var. **arundinaceus** var. nov.

A typo culmis altioribus et robustioribus, ramulis paniculorum longioribus, articulis rhacheos paucioribus, gluma prima valde flava, arista glumae secundae ad 6 mm. longa differt.

Culms robust, erect, 5–8-noded, 1–1.8 meters tall, glabrous or slightly scabrous beneath the panicle; sheaths more or less scabrous on the keel,

those in the middle of the culm slightly shorter than the internodes, the basal sheaths overlapping; ligule a row of even white hairs about 0.2 mm. long; blades as much as 60 cm. long, 5–8 mm. wide, folded at the base, the margins and midnerve more or less spinulose-scabrous; panicle purplish yellow, 20–30 cm. long, contracted or rather loose, the lower branches 6–8 cm. long, flexuous, sometimes bearing 1 or 2 short branchlets; racemes 2–4-jointed, mostly shorter than the panicle branches, the joints slender, 5–15 (rarely to 20) mm. long, the pedicels usually not exceeding the sessile spikelets; sessile spikelets narrowly lanceolate, pale or stramineous, 8–10 mm. long including the sharp 2–4 mm. long callus; the callus bearded on the back and margins with tawny hairs as much as 1.5 mm. long; glumes coriaceous and muricate over the entire dorsal surface, the keels spinulose; first glume narrowly somewhat truncate, often spinulose on the upper half; second glume mucronate or with an awn as much as 6 mm. long; awn on fertile lemma 10–20 mm. long, flexuous, slightly twisted below, not or only slightly geniculate; pediceled spikelets about 6–8 mm. long, lanceolate or more or less subulate.

BRITISH NEW GUINEA: Western Division: Panzara, between Morehead and Wassi Kussa Rivers, *Brass 8460* (A, TYPE, US), December, 1936 (savannah forests, on alluvial flats of creek).

Differs from the species in being much taller and more robust, having longer panicle branches, fewer-jointed racemes, and the glumes of the sessile spikelets yellow below rather than evenly purple throughout, the second glume with an awn as much as 6 mm. long. In some respects it suggests *Vetiveria intermedia* S. T. Blake, but that species has shorter and thicker rachis joints and pedicels, the pediceled spikelets are, on the whole, less developed, and the glumes are merely scabrous or nearly glabrous on the lower half rather than uniformly muricate as in both *C. filipes* and the new variety.

The cited specimen was reported as *Vetiveria filipes* by Chase (17, p. 315).

43. **Arthraxon** Beauv.

Arthraxon Beauv., Ess. Agrost. 111. *pl. 11, fig. 6.* 1812.

Spikelets in pairs or solitary, one sessile and perfect, mostly awned, often slightly laterally compressed, at length falling with the appressed rachis joint attached, the other, when present, pediceled, neuter or rarely staminate but usually abortive with only minute pedicels remaining attached to the base of the sessile spikelets; rachis slender, usually tardily disarticulating; first glume rounded on the back, the margins more or less inrolled, usually more or less bristly-hispid on the nerves; second glume keeled, 3-nerved; lower lemma hyaline, short, empty; fertile lemma hyaline or firmer at the base, entire or minutely bidentate, with usually a well developed dorsal awn arising from near the base. Annuals or perennials with flat blades, slender weak culms and digitate or approximate racemes.

TYPE SPECIES: *Arthraxon ciliare* Beauv. = *A. hispidus* (Thunb.) Makino (*Phalaris hispida* Thunb.).

1. **Arthraxon hispidus** (Thunb.) Makino, Bot. Mag. (Tokyo) 26: 214. July, 1912[24]; Hitchc., Brittonia 2: 128. 1936.

Phalaris hispida Thunb., Fl. Jap. 44. 1784. Type presumably from Japan.

Arthraxon ciliare Beauv., Ess. Agrost. 111, 152. *pl. 11, fig. 6.* 1812. No locality given.

Pollinia ciliaris (Beauv.) Spreng., Syst. Pl. 1: 289. 1825.

Culms slender, freely branching, ascending from a decumbent base, the nodes bearded; sheaths shorter than the internodes, pubescent on the collar, the margins ciliate; ligule membranous, ciliate, 1–2 mm. long; blades ovate to ovate-lanceolate, 2–5 cm. long, 5–15 mm. wide, glabrous or pubescent, the base cordate-clasping; racemes 2 to many (rarely solitary), 2–4 cm. long; rachis joints slender, glabrous or ciliate, from half to nearly as long as the spikelet; spikelets lanceolate, 3–5 mm. long, first glume rounded on the back, several-nerved, the nerves bristly-hispid; second glume acuminate, equal to or slightly longer than the first, the keel hispid; awn of the fertile lemma usually 5–15 mm. long, geniculate and twisted; sterile pedicel reduced to a minute bristle rarely half as long as the spikelet, often obsolete.

BRITISH NEW GUINEA: Central Division: Urunu, Vanapa Valley, alt. 1900 m., *Brass 4787* (GH, US) (common on old garden land). NETHERLANDS NEW GUINEA: 9 km. northeast of Lake Habbema, alt. 2800 m., *Brass 10735* (A, US) (on a native clearing in the forest).

Tropical and temperate regions of the Old World.

44. Andropogon L.

Andropogon L., Sp. Pl. 1045. 1753, Gen. Pl. ed. 5. 468. 1754.

Spikelets in pairs at each node of an articulate rachis, or in threes at the ends of the branches, one sessile and fertile, the other pediceled, staminate or neuter (rarely perfect), sometimes reduced to a single narrow glume; rachis and pedicels of the sterile spikelets slender or sometimes thickened upward, often villous; sessile spikelet dorsally compressed; glumes membranous-coriaceous, awnless, the first rounded, flat or concave dorsally, several-nerved, the median nerve often weak or wanting; second glume cymbiform, keeled; lemmas hyaline, the lower empty; fertile lemma narrow, entire or bifid, usually bearing a slender geniculate and twisted awn, the lemma sometimes reduced to a narrow stipe-like base to the awn; pediceled spikelets awnless (rarely awned), sometimes as large as the sessile and similar to it, but usually more or less reduced. Annuals or perennials of various habitats.

TYPE SPECIES: *Andropogon distachyus* L.

KEY TO THE SPECIES AND VARIETIES

1. Racemes solitary on the culms and branches; rachis joints thickened upward with scarious cupular or toothed appendages.
   2. Sessile spikelets 2–4 (rarely to 5) mm. long; rachis joints and pedicels glabrous.
      3. Sessile spikelets 3–5 mm. long, awned.
         4. Blades 1–4 cm. long, obtuse ..... 1. *A. brevifolius.*
         4. Blades 5–9 cm. long, tapering to an acute apex ..... 1a. *A. brevifolius* var. *cryptopodus.*

24 Same combination published by Merrill in Philip. Jour. Sci. Bot. 7: 229. Sept. 1912.

3. Sessile spikelets 2 mm. long, awnless.....1b. *A. brevifolius* var. *paradoxus.*
2. Sessile spikelets 7–8 mm. long; rachis joints and pedicels ciliate..2. *A. sanguineus.*
1. Racemes 2 to several on each peduncle (sometimes solitary in *A. annulatus*).
5. Racemes 1–8-jointed; panicle branches compound, the racemes borne on branchlets of the third or fourth order.
6. Racemes reduced to one sessile and two pediceled spikelets (rarely with one or two pairs of spikelets below); first glume of sessile spikelet prominently concave dorsally.
7. Sessile spikelets awned.....3. *A. micranthus.*
7. Sessile spikelets awnless.....3a. *A. micranthus* var. *muticispiculus.*
6. Racemes 3–8-jointed; first glume of sessile spikelet not prominently concave dorsally.....4. *A. spicigerus.*
5. Racemes 10- or more jointed; panicle branches simple or rarely once branched.
8. Inflorescence paniculate, the axis 4–14 cm. long.....5. *A. intermedius.*
8. Inflorescence digitate or the racemes rarely solitary.
9. First glume long-pilose below the apex and on upper margins, the silky hairs as long as the spikelet or longer, more or less obscuring the spikelets; awn twice-geniculate.....6. *A. sericeus.*
9. First glume more or less pilose and sometimes with long tubercle-based hairs on the upper margins, but the hairs not silky and obscuring the spikelets; awn once-geniculate.....7. *A. annulatus.*

1. **Andropogon brevifolius** Swartz, Prodr. Veg. Ind. Occ. 26. 1788; Kunth, Rev. Gram. 2: *pl. 196.* 1829; Hitchc., Brittonia 2: 128. 1936; Pilger, Nat. Pflanzenfam. ed. 2. **14e:** 166. *fig. 87.* 1940. Type from Jamaica.
Schizachyrium brevifolium (Swartz) Nees ex Miquel, Fl. Ind. Bat. 3: 495. 1855.
Andropogon fragilis R. Br. var. *malayanus* Merr., Enum. Philip. Fl. Pl. 1: 45. 1923. Type from the Philippines.

Annual; culms delicate, much branched, prostrate, trailing or leaning, more or less compressed, mostly 30–70 cm. long; sheaths glabrous, keeled, mostly shorter than the internodes; ligule very short, membranous, often ciliolate; blades flat, obtuse, 1–4 (rarely to 6) cm. long, 2–4 mm. wide, glabrous; racemes solitary, slender, 1–2.5 cm. long, each subtended by a glabrous sheathing spathe; rachis joints clavate, glabrous, shorter and more slender than the sessile spikelets, bidentate at summit; sessile spikelets 3–4 mm. long, the callus very short, white-bearded; first glume dorsally scaberulous, scabrous on the keels, bifid; awn of fertile lemma delicate, geniculate and twisted, as much as 1 cm. long; pediceled spikelets reduced to an awned glume 1–1.5 mm. long, the slender straight awn as much as 5 mm. long; pedicel glabrous, slightly shorter than the sessile spikelet.

British New Guinea: Western Division: Dagwa, Oriomo River, alt. 40 m., *Brass 5985* (GH, US) (common on damp flats and ridge slopes); Lake Daviumbu, Middle Fly River, *Brass 7812* (A, US) (common on sour savannah slopes). Northeast New Guinea: Morobe District: Kajabit, Markham Valley, *Clemens 10477* (US). Netherlands New Guinea: Balim River, alt. 1600 m., *Brass 11723* (A, US) (deforested slopes; locally abundant on sandy soil).
Tropical and temperate regions of both hemispheres.

1a. **Andropogon brevifolius** Swartz var. **cryptopodus** (Ohwi) comb. nov.
Andropogon cryptopodus Ohwi, Bot. Mag. (Tokyo) 56: 10. 1942. Type from Netherlands New Guinea.

Differs from the species in the more robust habit, longer (5–9 cm.) blades tapering to an acute apex, and slightly larger spikelets.

NETHERLANDS NEW GUINEA: Momi, 60 miles south of Manokwari, alt. 10 m., *Kanehira & Hatusima 13390* (A, TYPE COLL.) (in open grass field along the track to Lake Angi).

Ohwi allies his species to *Andropogon sanguineus,* but it is much more closely related to *A. brevifolius*. The spikelets are almost identical with those of the latter species, although they tend to be slightly larger. The only important differences seem to be the somewhat more robust habit and longer blades, which are acute rather than obtuse.

Ohwi's description and type duplicate agree rather well with the description of *Andropogon brevifolius* var. *fragilis* (R. Br.) Hack. (in DC., Mongr. Phan. 6: 364. 1889). This variety is based on *A. fragilis* R. Br., but Hackel's description does not well agree with the original diagnosis by Brown (11, p. 202), in which the rachis is said to be "sericeo-barbatis." Hackel's description states "racemis gracilibus, articulis glabris." The Kanehira and Hatusima specimen cited above has glabrous rachis joints.

1b. **Andropogon brevifolius** Swartz var. **paradoxus** (Buse) Ohwi, Acta Phytotax. Geobot. 11: 169. 1942.

Schizachyrium paradoxum Buse in Miquel, Pl. Jungh. 359. 1854. Type from Sumatra.

Schizachyrium brevifolium (Swartz) Nees ex Miquel subsp. *paradoxum* (Buse) Henr., Blumea 1: 308. 1935.

Differs from the species in having awnless sessile spikelets only 2 mm. long; pediceled spikelets 0.5 mm. long, awnless or with an awn about as long as the spikelet.

BRITISH NEW GUINEA: Northern Division: 1 mile north of East Embi Lake, *Reeder 849* (A, US) (forming mats in low wet ground).

Indo-China, Sumatra, Borneo, the Philippines, and New Guinea.

2. **Andropogon sanguineus** (Retz.) Merr., Philip. Jour. Sci. Bot. 12: 101. 1917; Chase, Jour. Arnold Arb. 20: 315. 1939.

Rottboellia sanguinea Retz., Obs. Bot. 3: 25 [error for 13]. 1783. Type from China.

Andropogon pseudograya Steud., Syn. Pl. Glum. 1: 365. 1854; Hack. in DC., Monogr. Phan. 6: 370. 1889. Type from Ceylon.

Schizachyrium sanguineum (Retz.) Alston, Suppl. Fl. Ceylon 6: 334. 1931.

Culms usually tufted, erect, rather slender, 50–100 cm. tall, freely branching above, the branches appressed to the flat side of the culm; sheaths keeled, glabrous and smooth; ligule membranous, about 1.5 mm. long; blades flat, 5–20 cm. long, 1–5 mm. wide, glabrous, the margins and midrib below scabrous; racemes solitary, slender, 5–7 cm. long, shortly exserted or the lower part included in the narrow spathe; rachis joints rather slender, dilated upward, slightly shorter than the sessile spikelets, glabrous or sometimes ciliate along the outer or both margins, the base bearded with white hairs 1–2 mm. long; sessile spikelets 7–8 mm. long, narrowly linear, the first glume glabrous, tuberculate-scabrous; awn of fertile lemma up to 15 mm. long, geniculate and twisted below; pediceled spikelets reduced, about 3 mm. long, awned, the awn slender, straight, about as long as the spikelet; pedicels about as long as the rachis joints or slightly shorter, ciliate on the margins, the hairs increasing in length upward.

BRITISH NEW GUINEA: Western Division: Lake Daviumbu, Middle Fly River, *Brass 7933* (A, US) (occasional on sour savannah slopes).

India to South China, Malaysia, and New Guinea.

3. **Andropogon micranthus** Kunth, Rev. Gram. 1: 165. 1829; Hitchc., Brittonia 2: 128. 1936. Based on *Holcus parviflorus* R. Br.
Holcus parviflorus R. Br., Prodr. Fl. Nov. Holl. 1: 199. 1810. Type from Australia.
Andropogon parviflorus (R. Br.) Domin, Bibl. Bot. 85: 263. 1915 (non Roxb. 1820).
Capillipedium parviflorum (R. Br.) Stapf in Prain, Fl. Trop. Afr. 9: 169. 1917.

Perennial; culms tufted, slender, up to 1 meter or more tall, erect or ascending, simple or sparingly branched, glabrous or appressed-pubescent, especially near the nodes; nodes short-bearded; sheaths mostly shorter than the internodes, glabrous or more or less papillose-pubescent, the margins ciliate, the collar often villous; ligule very short, truncate, ciliolate; blades flat or the margins revolute, as much as 30 cm. long, 2–6 mm. wide, rather firm, the margins and upper surface scabrous, smooth to scaberulous beneath, glabrous or puberulent, often with a few long tubercle-based hairs on the upper surface near the ligule; panicle 8–25 cm. long, the branches and branchlets very slender, pubescent in their axils, otherwise usually glabrous, sometimes puberulent throughout; racemes borne on branches of the third and fourth order, 1-jointed, reduced to 1 sessile and 2 pediceled spikelets (rarely 2 or more jointed and with one or more pairs of spikelets below); sessile spikelets narrowly oblong to elliptic, 2.5–3 mm. long, the callus short-bearded; first glume hispidulous, shallowly concave on the back; fertile lemma narrow, awned, the awn geniculate, twisted, 11–16 mm. long; pediceled spikelets awnless, usually staminate (rarely neuter), similar to the sessile spikelet or more or less reduced.

British New Guinea: Central Division: Rona, Laloki River, alt. 450 m., *Brass 3558* (A, US) (common on savannah hillsides); Urunu, Vanapa Valley, alt. 1900 m., *Brass 4799* (GH, US) (common on open grasslands); ? Division: "Barowara," *MacGregor 10* (US); Quaipo, *MacGregor 20* (US). Northeast New Guinea: Morobe District: Wau, *Clemens 10458* (US) (steep grasslands above gold fields); Kajabit, Markham Valley, *Clemens 10451bis* (US) (grassland). New Britain: Cape Glouster, *Burcham 141* (US) (in open grassland).

Tropical and subtropical regions of the Old World.

MacGregor 20 has some of the racemes 3- or 4-jointed and is, in this respect, like *Andropogon spicigerus*. The first glume of the sessile spikelet, however, is rather prominently concave dorsally and has only 2 or 3 intercarinal nerves, characters which would place this specimen in *A. micranthus*.

3a. **Andropogon micranthus** Kunth. var. **muticispiculus** (Ohwi) comb. nov.
Bothriochloa parviflora (R. Br.) Ohwi var. *muticispicula* Ohwi, Tokyo Sci. Mus. Bull. 18: 13. 1947.

British New Guinea: Central Division: Kanosia, *Carr 11106, 11309* (NY) (open savannah land); Northern Division: South of Dobodura, *Reeder 801* (A, US) (common in open grassland); about 9 miles northwest of Oro Bay, *Reeder 810* (A, US) (in dense grassland; panicles open); Without precise locality: *MacGregor 52* (US). Northeast New Guinea: Morobe District: Kajabit, Markham Valley, *Clemens 10541* (US) (grassland); Ramu Valley, near the headwaters of the Markham River, *Rogers 3003* (A).

This variety appears to differ from the species in no other particular except the absence of an awn on the perfect spikelet. Examination of the extensive collections of this species in the U. S. National Herbarium

reveals no awnless specimens except those from New Guinea. The two forms apparently grow side by side, as one of the collections (*Clemens 10541*) consisted of a mixture of awned and awnless plants.

4. **Andropogon spicigerus** (S. T. Blake) comb. nov.

Capillipedium spicigerum S. T. Blake[25], Queensl. Univ. Dept. Biol. Papers 2: 43. 1944. Type from Australia.

Culms 90–120 cm. tall, slender to subrobust, erect or somewhat geniculate at base, simple or sparsely branching, glabrous or sometimes appressed-pilose, often pruinose below the nodes; sheaths terete or somewhat keeled above, glabrous to more or less papillose-hirsute; ligule truncate, ciliolate, about 0.75 mm. long; blades linear, flat or the margins revolute, as much as 40 cm. long, 5–10 mm. wide, narrowed toward the base, the apex long-attenuate, scaberulous above, glabrous beneath, the margins scabrous, the upper surface often pilose toward the base, otherwise glabrous; panicle ovate to lanceolate, purplish or rarely pale, 10–20 cm. long, the branches and branchlets slender, pubescent in their axils, otherwise glabrous or sometimes sparsely puberulent; racemes 3–8(ours mostly 4–5-)-jointed, borne on branches of the third or fourth order; joints and pedicels subequal, half to two-thirds as long as the sessile spikelets, ciliate on one or both sides; sessile spikelet oblong-lanceolate, acutish, the callus short-bearded; first glume 6–9-nerved (2–5 intercarinal nerves), dorsally more or less stiff-puberulent and slightly depressed, the keels shortly pectinate on the upper half; second glume scabrous on the keel or nearly smooth; sterile lemma hyaline, half to two-thirds as long as the glumes; fertile lemma narrow, awned, the slender awn 12–18 mm. long, geniculate and twisted below the bend; pediceled spikelets awnless, staminate or neuter, shorter and narrower than the fertile or sometimes nearly as long (in our specimens mostly neuter and reduced to small lanceolate glumes half to two-thirds as long as the sessile spikelets).

NETHERLANDS NEW GUINEA: Balim River, alt. 1600 m., *Brass 11616, 11805, 11845* (A, US) (common on deforested slopes).

Australia and New Guinea.

Closely related to *Andropogon micranthus* but differing in the 3–8-jointed racemes, sessile spikelet with the first glume less concave on the back and often with 4 or 5 intercarinal nerves, and the more robust habit. Blake (7, p. 45) states that there are always 4 or 5 intercarinal nerves, but our specimens, which agree well with the original description and with a type duplicate (at US) in other respects, often have only 2 or 3 intercarinal nerves; however, some of the sessile spikelets on these plants have 4 or 5 intercarinal nerves on the first glumes in the same inflorescence. The actual spikelet differences between this species and *A. micranthus* appear very slight, but the plants have a rather distinct appearance and the 3–8-jointed raceme seems quite constant. Perhaps the species would be better treated as a variety, but for the present it seems preferable to retain it as a species pending further study of collections from other parts of its range.

[25] Although Blake uses the same epithet, this is not a new combination based on *Chrysopogon parviflorus* (R. Br.) Benth. var. *spicigera* Benth. (Fl. Austral. 7: 538. 1878), but a new species based on a new type. For a detailed discussion see Blake (7, p. 43–46. 1944).

The cited specimens were all reported as *Andropogon intermedius* R. Br. by Chase (18, p. 89).

5. **Andropogon intermedius** R. Br., Prodr. Fl. Nov. Holl. 1: 202. 1810. Type from Australia.
   Bothriochloa intermedia (R. Br.) A. Camus, Ann. Soc. Linn. Lyon II. 76: 164. 1931.

Perennial; culms tufted, 50–100 cm. or more tall, erect or geniculate at base, simple or sparingly branched, glabrous, the nodes sometimes short-bearded; sheaths glabrous, terete or slightly keeled upward, mostly shorter than the internodes; ligule very short, truncate; blades flat or revolute, 10–30 cm. long, 3–6 mm. wide, smooth or scaberulous, the margins scabrous; panicle 6–15 cm. long, open, loose to somewhat dense, the axis 3–14 cm. long; branches slender, solitary or in pairs, the lower sometimes in fours, usually simple but sometimes branched, often bearded in the axils, otherwise glabrous; racemes slender, 2–5 cm. long, 10- or more jointed; joints and pedicels ciliate, the hairs up to 2.5 mm. long; sessile spikelet elliptic-oblong, obtuse, 3–4 mm. long, the callus short-bearded; first glume with 5–7 intercarinal nerves, pectinate on the upper part of the keels, dorsally depressed or sometimes with a circular pit, more or less pubescent on the lower half; awn of the narrow fertile lemma slender, 10 mm. or more long, geniculate and twisted below the bend; pediceled spikelets awnless, staminate or neuter, about as long as the sessile and similar to it but narrower.

BRITISH NEW GUINEA: Central Division: Kanosia, *Carr 11329* (NY) (open savannah land).

China to Malaysia, Australia, and New Guinea.

6. **Andropogon sericeus** R. Br., Prodr. Fl. Nov. Holl. 1: 201. 1810; Bailey, Queensl. Agric. Jour. 7(4): 350. 1900; White, Proc. Roy. Soc. Queensl. 34: 15. 1923. Type from Australia.
   Dicanthium sericeum (R. Br.) A. Camus, Bull. Mus. Hist. Nat. (Paris) 27: 549. 1921.

Perennial; culms densely tufted, erect, subrobust, 40–100 cm. tall, simple or with few to several floriferous branches from the upper nodes, often pruinose; nodes stellate-bearded; sheaths glabrous, keeled above, mostly shorter than the internodes, often pruinose like the culms; ligule membranous, ciliolate, 1–1.5 mm. long; blades flat or revolute, rigid, 10–25 cm. long, 2–5 mm. wide, glabrous below, the upper surface and margins scabrous; racemes 2–7, digitate, 2.5–5 cm. long, silky-villous; rachis joints and pedicels slender, the pedicels about half as long as the sessile spikelets, the joints slightly shorter, both ciliate, the hairs increasing in length upward; sessile spikelet oblong to ovate-oblong, about 4 mm. long; first glume obtuse, 7-nerved, pubescent on the lower half, papillose-pilose below the apex and along the margin on the upper half, the hairs equaling the spikelet or longer; awn 20–25 mm. long, twice geniculate; pediceled spikelets similar to the sessile, but awnless.

Australia.

No specimens of this species from New Guinea were seen, but it is included here since it has been reported several times. The description was based on Australian specimens.

7. **Andropogon annulatus** Forsk., Fl. Aegypt. Arab. 173. 1775; White, Proc. Roy. Soc. Queensl. 34: 15. 1923. Type from the banks of the Nile.
Dichanthium annulatum (Forsk.) Stapf in Prain, Fl. Trop. Afr. 9: 178. 1917.

Perennial; culms slender, densely tufted, erect or geniculately ascending, 50–100 cm. tall, glabrous except for the short-bearded nodes; sheaths glabrous, distinctly shorter than the internodes, slightly keeled above; ligule membranous, ciliolate, 0.5–1.5 mm. long; blades narrowly linear, 5–15 cm. long, 1.5–3 mm. wide, flat or revolute, the margins and lower surface scaberulous, the upper surface often sparsely pilose with tubercle-based hairs; racemes 1–5, digitate, 2–5 cm. long, spikelet-bearing to the base; rachis joints and pedicels subequal or the joints shorter, slender, about half as long as the sessile spikelets or shorter, ciliate, the hairs increasing in length upward; sessile spikelet oblong-elliptic, obtuse, about 4 mm. long; first glume prominently nerved, more or less pilose, sometimes with long tubercle-based hairs especially near the margins above; awns slender, 15–20 mm. long, geniculate and twisted below the bend; pediceled spikelets similar to the sessile but awnless.

BRITISH NEW GUINEA: Central Division: Port Moresby, *Brass 8787* (A, US) (common on roadsides); Western Division: Daru Island, *Brass 6404* (A, US) (growing about the wharf, apparently of recent introduction).

Africa to India, China, Australia, and New Guinea.

The cited specimens were reported as *Andropogon annulatus* var. *monostachys* F. Muell. ex Benth., by Chase (17, p. 315), but examination of a type fragment (at A) reveals that this variety has much larger spikelets and the racemes are stouter. This form has been described as a species under the genus *Dichanthium* (*D. fecundum*) by S. T. Blake (7, p. 51. 1944). In his discussion under this species, Blake states (op. cit. p. 54) that the pediceled spikelets usually are perfect and contain a well developed pistil. The pistil produces a grain and seems to be equally fertile to that of the sessile spikelet. These pediceled spikelets commonly have also a well developed geniculate and twisted awn, he states. Blake's new species is apparently confined to Australia.

45. **Cymbopogon** Spreng.

Cymbopogon Spreng., Pl. Pugill. 2: 14. 1815.

Racemes in pairs, one sessile, the other short-peduncled, included in an inflated spathe, the spathes in a large compound inflorescence; spikelets paired as in *Andropogon*, but the lower pair, in one or both racemes, homogamous (both awnless, staminate or neuter), otherwise the sessile spikelet perfect, usually awned, the pediceled spikelet staminate, awnless; rachis fragile, the joints falling attached to the sessile spikelet, the callus short, blunt; sessile spikelet more or less dorsally compressed; glumes membranous-chartaceous, the first flat or rounded on the back, rather prominently two-keeled, the margins inflexed; second glume wing-keeled toward the apex; lemmas hyaline or the lower thinly membranous, the fertile bearing a twisted geniculate awn with a glabrous column (rarely awnless). Robust often aromatic perennials with simple culms below the spathaceous inflorescences. This genus includes the oil grasses of commerce.

TYPE SPECIES: *Cymbopogon Schoenanthus* (L.) Spreng. (*Andropogon Schoenanthus* L.).

1. **Cymbopogon procerus** (R. Br.) Domin, Bibl. Bot. 85: 273. 1915; Hitchc., Brittonia 2: 128. 1936.

   Andropogon procerus R. Br., Prodr. Fl. Nov. Holl. 1: 202. 1810. Type from Australia.

Culms erect, 1–2.5 meters tall, glabrous or sometimes more or less pubescent below the nodes; sheaths glabrous, shorter than the internodes; ligule membranous, 3–4 mm. long, more or less erose or ciliate at summit; blades as much as 90 cm. long, 5–20 mm. wide, attenuate at the base, usually somewhat involute, glabrous on both surfaces, the margins scabrous; panicle 15–30 cm. long, narrow, dense, with numerous short branches, the acuminate cymbiform spathes about equal to or longer than the 1.5–2 cm. long racemes; rachis joints and pedicels equal, rather slender, about half as long as the sessile spikelet, clothed with spreading silky hairs, those on the upper part up to 3 mm. long; lowermost pair of spikelets on the sessile raceme homogamous, awnless, reduced to a many-nerved first glume 3–4 mm. long or sometimes with a short second glume enclosed, the pediceled spikelets throughout the inflorescence of the same nature; sessile spikelet about 4 mm. long including the short-bearded callus; first glume lanceolate, 5–6-nerved, the nerves prominent above, becoming obscure toward the base, the keels narrowly winged toward the obtuse or bifid apex; second glume cymbiform, equal to the first, about 5-nerved, narrowly wing-keeled toward the summit, the margins ciliate; lemmas subequal, about one-fourth shorter than the glumes, the lower empty, thinly membranous, the margins ciliate; fertile lemma hyaline, cleft to the middle and bearing a twisted and geniculate awn from the base of the cleft, the awn about 12 mm. long, the brownish column about 5 mm. long.

BRITISH NEW GUINEA: Central Division: Baroka, Nakeo District, alt. 50 m., *Brass 3713* (GH, US) (small scattered tufts); Western Division: Wuroi, Oriomo River, alt. 10–30 m., *Brass 5725* (GH, US) (on savannah at about its junction with the rain-forest); Daru Island, *Brass 6364* (A, US) (uncommon on drier soils of savannah forests); Gaima, Lower Fly River, *Brass 8370* (A, US) (clumps in denser savannah forest).

Australia and New Guinea.

The cited specimens agree with the short original description, and, in general, with the more detailed description by Hackel (23, p. 94). While Hackel states that there are no nerves between the keels on the first glume, the New Guinea specimens have 3 or 4 nerves which are rather prominent above and obscure below, and the keels are very narrowly winged. The specimen cited as *Andropogon Nardus* L. var. *grandis* Hack. by C. T. White (75, p. 15) may be this species.

Cymbopogon flexuosus (Nees ex Steud.) Stapf, Kew Bull. 1906: 319. 1906.

Andropogon flexuosus Nees ex Steud., Syn. Pl. Glum. 1: 388. 1854. Type from India.

Andropogon Nardus L. var. *flexuosus* (Nees ex Steud.) Hack. in DC., Monogr. Phan. 6: 603. 1889; K. Schum., Notizbl. Bot. Gart. Berlin 2: 91. 1898; K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 173. 1901.

This is one of the Citronella or Lemon Grasses. It has been cultivated by the colonists and by the natives of New Britain, according to the above

reports. This species is characterized by its large, loose, greyish or slate colored panicles with very slender long flexuous and often drooping branches and usually very slender acute spikelets. No specimens from this region have been seen.

46. **Hyparrhenia** Anderss.

Hyparrhenia Anderss., Nova Acta Soc. Sci. Upsal. III. 2: 231, 244, 254. 1856, nomen; in Schweinf., Beitr. Fl. Aethiop. 300. 1867, nomen; Fourn., Mex. Pl. 2: 51, 67. 1886, sine descr.; Stapf in Prain, Fl. Trop. Afr. 9: 291. 1918, descr.

Racemes in pairs, one sessile, the other short-peduncled, subtended by a narrow sheathing spathe, the spathes in a large compound inflorescence; spikelets paired, the lowest pair in one or both racemes homogamous, staminate or neuter as in *Cymbopogon*, but the sessile perfect spikelet disarticulating obliquely, leaving a sharp-pointed callus and the awn of the fertile lemma hirtellous below the bend; glumes membranous-chartaceous, the first sometimes dorsally grooved, with inflexed margins, but the edges rounded, not sharply keeled; second glume cymbiform, rounded below, somewhat keeled toward the summit; pediceled spikelets often with the first glume short-awned. Perennials, not aromatic, with compound spatheate panicles.

TYPE SPECIES: *Hyparrhenia pseudocymbaria* (Steud.) Stapf.

1. **Hyparrhenia bracteata** (Humb. & Bonpl. ex Willd.) Stapf in Prain, Fl. Trop. Afr. 9: 360. 1918; Hitchc., Brittonia 2: 128. 1936; Pilger, Nat. Pflanzenfam. ed. 2. 14**3**: *fig. 94*. 1940.

Andropogon bracteatus Humb. & Bonpl. ex Willd., Sp. Pl. 4: 914. 1806. Type from Cumana [Venezuela].

Cymbopogon bracteatus (Humb. & Bonpl. ex Willd.) Hitchc., Contr. U. S. Nat. Herb. 17: 209. 1913.

Culms erect, tufted, 60–200 cm. tall; sheaths hirsute or the upper glabrous, the basal densely villous; ligule membranous, about 2–3 mm. long, ciliate or often erose; blades linear, as much as 60 cm. long, 3–6 mm. wide, flat or more or less convolute, glabrous above, the lower surface more or less pubescent; panicle narrow, 20–40 cm. long; spathes 2–4 cm. long, reddish brown, glabrous or nearly so; racemes about 1 cm. long, the common peduncle slender, exserted from the side of the spathe, clothed with yellow spreading papillose-based hairs, the racemes finally divergent or reflexed, one of them sessile with a pair of homogamous sterile awnless spikelets at base and above them one perfect sessile long-awned spikelet and two sterile awnless pediceled spikelets, the other raceme similar but short-peduncled and without the pair of homogamous spikelets at base; perfect spikelet 6–7 mm. long including the sharp-pointed callus, dorsally glabrous, the callus and slender pedicels clothed with short white hairs, the awn of the fertile lemma 2.5–4 mm. long, geniculate in the middle, the column hirtellous; sterile spikelets similar but the first glume with a short straight awn 1–2 mm. long.

BRITISH NEW GUINEA: Central Division: Urunu, Vanapa Valley, alt. 1500 m., *Brass 4817* (A, US) (one of the commonest of open grassland species).

Tropical America, tropical Africa, Indo-China, China, and New Guinea.

The cited specimens are overmature and most of the spikelets have fallen. They are, however, complete enough for fairly accurate compari-

son and seem to be identical with plants of this species from China. They are slightly smaller than the South American plants and have glabrous rather than appressed-hirsute spathes.

47. **Themeda** Forsk.

Themeda Forsk., Fl. Aegypt. Arab. 178. 1775.

Spikelets in pairs, or in threes in the terminal rachis joints, the lowermost two pairs of the raceme homogamous, staminate or neuter, awnless, closely approximate and appearing verticillate or like an involucre, the remaining 1–3 pairs heterogamous, one sessile and perfect, the other pediceled, staminate or neuter; fertile spikelets terete, usually awned (rarely awnless), obliquely disarticulating with a sharp rufous-bearded callus; racemes solitary in each proper spathe, these aggregated in flabellate clusters or solitary in the axils. Perennials or annuals with compound or simple spatheate panicles.

TYPE SPECIES: *Themeda triandra* Forsk.

KEY TO THE SPECIES AND VARIETIES

1. Involucral spikelets sterile, reduced to a single thin, membranous glume; plants annual.....1. *T. frondosa.*
1. Involucral spikelets with two well developed glumes, often staminate; plants perennial.
   2. Involucral spikelets borne at the same level; culms slender; midrib of blades thin, fine.....2. *T. triandra.*
   2. Involucral spikelets borne at different levels; culms robust; midrib of blades broad, conspicuous.
      3. Involucral spikelets clothed with golden or brown tubercle-based hairs; fertile spikelets awnless or with a short straight awn 10 mm. long or less.
         4. Involucral spikelets 6.5–8 mm. long; fertile spikelets 6.5–7 mm. long including the callus; first glume sparsely puberulent, prominently 5–7-nerved.....3. *T. gigantea.*
         4. Involucral spikelets 10–13 mm. long; fertile spikelets 9–10 mm. long including the callus; the first glume densely puberulent with golden or brownish hairs.....3a. *T. gigantea* var. *amboinensis.*
      3. Involucral spikelets glabrous or scaberulous; fertile spikelets awned, the awn 2.5–3 cm. long, geniculate and twisted....3b. *T. gigantea* var. *novoguineensis.*

1. **Themeda frondosa** (R. Br.) Merr., Bur. Sci. Publ. Manila 9: 89. 1917; Chase, Jour. Arnold Arb. 20: 316. 1939.

   Anthisteria frondosa R. Br., Prodr. Fl. Nov. Holl. 1: 200. 1810. Type from Australia.

   Themeda arguens sensu Hack. in DC., Monogr. Phan. 6: 657. 1889 (non *Stipa arguens* L.).

Annual; culms erect to geniculately ascending, more or less compressed, often rooting from the lower nodes, 60–120 cm. tall (to 3 meters fide Hackel); sheaths keeled, much shorter than the internodes, glabrous to more or less papillose-hirsute; ligule membranous, 1–2 mm. long, rounded-truncate; blades flat, 10–40 cm. long, 4–6 mm. wide, glabrous to more or less pilose above toward the base, smooth below, the upper surface and margins scaberulous to scabrous; panicle one-third to half the length of the plant, strongly interrupted, composed of 2 or 3 remote nodes, the branches solitary to binate and bearing numerous fascicled branchlets,

these capitate, each head bearing 6–20 fertile racemes and often several sterile ones; proper spathes 3.5–4 cm. long, long-attenuate, glabrous to more or less papillose-pilose toward the base; racemes about 1.5 cm. long, bearing 1 fertile spikelet; involucral spikelets 8–10 mm. long, reduced to one thin membranous glume, this acute, bi- or tricuspidate, 5–7-nerved, one or both margins broadly scarious-winged; perfect spikelets 8–10 mm. long, including the 3–4 mm. long callus; the callus sharp-pointed, curved, glabrous dorsally, the sides and ventral part densely bearded, the hairs at first golden, becoming brown when mature, extending to about the middle of the spikelet; glumes hispid to tuberculate-scabrous above, smooth below; awn stout, 7–9 cm. long, geniculate and twisted, puberulent below the bend.

BRITISH NEW GUINEA: Western Division: Mabaduan, *Brass 6474* (A, US) (locally abundant on sandy soil in savannah forests).

Philippines to Malaysia, Australia, and New Guinea.

2. **Themeda triandra** Forsk., Fl. Aegypt. Arab. 178. 1775; K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 173. 1901; C. E. Hubb., East. Afr. Pasture Pl. 28. *fig. 15.* 1926; Blatter & McCann, Imp. Council Agric. Res. Sci. Monogr. 5: 115. *pl. 74.* 1935; Pilger, Nat. Pflanzenfam. ed. 2. 14e: 179. *fig. 95.* 1940. Type from Arabia.

Anthistiria imberbis Retz., Obs. Bot. 3: 11. 1783; C. T. White, Proc. Roy. Soc. Queensl. 34: 15. 1923. No locality is given.

Anthistiria australis R. Br., Prodr. Fl. Nov. Holl. 1: 200. 1810; K. Schum., Bot. Jahrb. 9: 197. 1889. Type from Australia.

Anthistiria Forskalii Kunth, Rev. Gram. 1: 162. 1829.[26]

Anthistiria vulgaris Hack., Nat. Pflanzenfam. II. 2: 29. *fig. 20.* 1887[27]; K. Schum. & Hollr., Fl. Kais. Wilhelmsland 22. 1889.

Themeda Forskalii (Kunth) Hack. in DC., Monogr. Phan. 6: 659. 1889, Bot. Jahrb. 13: 261. 1890.

Themeda australis (R. Br.) Stapf in Prain, Fl. Trop. Afr. 9: 420. 1919.

Perennial; culms rather slender, erect or geniculately ascending, terete or subcompressed, glabrous, often pruinose below the nodes; sheaths overlapping below, shorter than the internodes in the upper part of the culm, keeled, glabrous or more or less papillose-hispid or pilose; ligule membranous, ciliolate, 1–1.75 mm. long, rounded-truncate; blades with a thin fine midrib, linear, 10–40 cm. long, 2–7 mm. wide, usually glabrous beneath, the margins and upper surface often papillose-pilose; panicle narrow, one-fourth to one-third the length of the plant; racemes 12–18 mm. long on peduncles 1–5 mm. long; the involucral spikelets borne at the same level, glabrous or with scattered stiff tubercle-based hairs; fertile spikelets 6–9 mm. long including the brown hairy callus, dorsally glabrous, hispidulous toward the apex; awns 3–6 mm. long, twisted and geniculate, the column puberulent.

[26] Kunth gives as the basis of this name *Themeda polygama* Forsk., but there is no *T. polygama* in Forskal's work. There is a *T. polygama* Gmel. (Syst. Nat. 2: 149. 1791) in which the reference is: "Forsk. Fl. aeg. arab. p. 178." The only species of *Themeda* in that work is *T. triandra* Forsk.

[27] Hackel gives no description, but there is an excellent plate. He states: "*A. ciliata* der Autoren, nicht L. fil." The distribution is given as from Syria to Algeria to Capeland and Tasmania, the "Kangaroo Grass" of the Australian farmer. In DC., Monogr. Phan. 6: 659. 1889, Hackel reduces this species to *Themeda Forskalii* (Kunth) Hack. = *T. triandra* Forsk.

BRITISH NEW GUINEA: Central Division: Budotobara, alt. about 100 m., *Brass 765* (GH, US) (a dominant species on dry savannahs); Rona, Laloki River, alt. 450 m., *Brass 3692* (A, US) (common savannah grass); Baroka, Nakeo District, alt. 50–100 m., *Brass 3723* (the dominant grass on higher ridges in this locality); Kanosia, *Carr 11133* (NY) (open savannah land); Northern Division: About 9 miles northwest of Oro Bay, *Reeder 803* (A, US) (bunchgrass, common in grasslands); Western Division: Wuroi, Oriomo River, alt. 10–30 m., *Brass 5873* (rare, scattered on banks of a savannah stream); Dagwa, Oriomo River, alt. 40 m., *Brass 5927* (A, US) (the dominant species on large areas of open ridges); Daru Island, *Brass 6269* (A, US) (dominant grass over most of savannah forest). NORTHEAST NEW GUINEA: Morobe District: Ramu Valley, near the headwaters of the Markham River, *Rogers 3004* (A). NETHERLANDS NEW GUINEA: West of Hollandia, *Sigafoos 28* (A). SOLOMON ISLANDS: Guadalcanal: Berande, *Brass 2551* (GH) (the principal species on the extensive grassy slopes peculiar to the west side of the Island); Florida: *Brass 3241* (GH) (stony hillsides, common, grows in tussocks).

Widely distributed in tropical and temperate regions of the Old World.

3. **Themeda gigantea** (Cav.) Hack. in DC., Monogr. Phan. 6: 670. 1889; K. Schum., Notizbl. Bot. Gart. Berlin 2: 92. 1898.

Anthistiria gigantea Cav., Ic. Pl. 5: 36. *pl. 458.* 1799; F. Muell., Pap. Pl. 2: 51. 1886. Type from the Philippines.

Perennial; culms caespitose, erect, 1.5–4 meters tall, robust, glabrous, terete or subcompressed, unbranched below the inflorescence, often pruinose below the nodes; sheaths shorter than the internodes, compressed, keeled, glabrous or somewhat pubescent on the upper margins; ligule short, truncate to rounded, membranous, ciliolate; blades lanceolate-linear to narrowly linear, 30–100 cm. long, 5–25 mm. wide, flat or canaliculate, rigid, erect, scabrous above, often glaucous below, the margins serrulate-scabrous, the midrib broad, prominent; panicle ample, as much as 1 meter or more long; spathes 1–1.2 cm. long; racemes divergent, about 1 cm. long, borne on peduncles 1–2 mm. long; involucral spikelets 6.5–8 mm. long, borne at different levels, the first glume clothed with golden or brownish tubercle-based hairs; perfect spikelets awnless, usually solitary in each raceme, 6.5–7 mm. long including the 1.5 mm. long callus, sparsely puberulent, the first glume distinctly 5–7-nerved.

SOLOMON ISLANDS: Florida: N'Gela, *Brass 3518* (GH) (growing here and there along the foreshores; very tall, coarse tussock grass).

A wide ranging polymorphic species. The above description applies to Hackel's subsp. *genuina* var. *genuina*.

3a. **Themeda gigantea** (Cav.) Hack. var **amboinensis** Hack. in DC., Monogr. Phan. 6: 673. 1889.

Racemes 1.5–2 cm. long; peduncles 5–7 mm. long, pilose with yellowish or brownish hairs at least on the upper half; spathes glabrous, 2–3.5 cm. long; involucral spikelets 10–13 mm. long, the first glume clothed with yellowish to brownish tubercle-based hairs; perfect spikelets densely puberulent with golden or brownish hairs, 9–10 mm. long including the 2 mm. long callus, 1 or 2 in each raceme, awnless or with a short straight awn as much as 10 mm. long.

BRITISH NEW GUINEA: Central Division: Bisiatabu, alt. about 470 m., *Brass 634* (A, US) (tall coarse grass 6–8 ft. high on dry savannahs); Gulf Division: Kerema, *Brass 1205* (GH, US) (open grassland near the coast); Western Division: Daru Island, *Brass 6382* (A, US) (about edges of rain forest second

growths, not common; in clumps about 3 meters high); Lake Daviumbu, Middle Fly River, *Brass 7768* (A) (a solitary specimen in an overgrown garden clearing). NETHERLANDS NEW GUINEA: Balim River, alt. 1600 m., *Brass 11678* (A, US) (plentiful along old dykes and other well drained situations on river plain; clumps up to 3 meters high). NEW BRITAIN: *R. Parkinson 64* (US). SOLOMON ISLANDS: San Cristoval: Waimamura, *Brass 2857, 3126* (GH) (small area of natural grassland; rare; tall robust species).

Netherlands Indies to New Guinea.

Distinguished from the species by the longer spathes, longer peduncles, larger involucral spikelets, and the larger perfect spikelets, which are often borne two in each raceme.

3b. **Themeda gigantea** (Cav.) Hack. var. **novoguineensis** var. nov.

A typo differt spiculis masculinis dorso glabris vel scaberulis, haud ferrugineis vel brunneis basi tuberculatis patentibus dense hirsutis; spiculis hermaphroditis aristatis, aristis 2.5–3 cm. longis. A subsp. *caudata* Hackelii spiculis hermaphroditis in utroque racemo paucioribus et paullo brevioribus, spiculis masculinis brevioribus differt.

Racemes about 1.5 cm. long bearing usually 1 (rarely 2) perfect spikelets; involucral spikelets 8–9 mm. long, scabrous on the keels, otherwise scaberulous; perfect spikelets brown, 7–9 mm. long including the 2–3 mm. long callus, dorsally puberulent-hispidulous, the hairs sometimes obscure toward the base; fertile lemma awned, the awn brown, 2.5–3 cm. long, geniculate at about the middle, the column puberulent-hispidulous.

BRITISH NEW GUINEA: Central Division: Astrolabe, *Armit 44* (US); Rona, Laloki River, alt. 450 m., *Brass 3589* (A, US) (very tall robust species; leaves glaucous when young); Baroka, Nakeo District, alt. 50 m., *Brass 3710* (GH, TYPE, US), April, 1933 (the dominant grass on the lower *Eucalyptus* forest ridges; grows in large leafy clumps up to 3 meters high; leaves glaucous green); Port Moresby, alt. 200 m., *Brass 8782* (A, US) (open savannah forest; dominant grass on stony hillsides; clumps 1.5–2 meters high); Kanosia, alt. about 30 m., *Carr 11235* (US, NY) (on open grassland; grass about 10 ft. tall).

Differs from the species in having involucral spikelets glabrous to scaberulous rather than pilose with reddish or brownish tuberculate-based spreading hairs, and in the awned fertile lemma. This variety is perhaps closest to subsp. *caudata* Hack., but in that the racemes bear 2 or 3 fertile spikelets, which are 9–11 mm. long, and involucral spikelets 12–15 mm. long.

Brass 8782 was reported as *Themeda australis* (R. Br.) Stapf by Chase (17, p. 316), but that species (treated here as a synonym of *T. triandra*) has involucral spikelets borne at the same level and the perfect spikelets dorsally glabrous, hispidulous only toward the apex.

48. **Germainia** Bal. and Poitr.

Germainia Bal. and Poitr., Bull. Soc. Hist. Nat. Toulouse 7: 344. 1873.

Racemes long-exserted, solitary, capitulate, terminating the culms, composed of 3–6 sessile marginal staminate spikelets, the broad coriaceous first glumes forming an urn-like receptacle enclosing the long-awned perfect pediceled spikelets; sessile staminate spikelets 2-flowered, the second glume and lemmas membranous-hyaline; pediceled perfect spikelets terete or

somewhat flattened, disarticulating obliquely with a sharp bearded callus, the glumes chartaceous-indurate; fertile lemma bearing a long stout twisted and geniculate awn; slender erect perennials with flat blades.

TYPE SPECIES: *Germainia capitata* Bal. and Poitr.

1. **Germainia capitata** Bal. and Poitr., Bull. Soc. Hist. Nat. Toulouse 7: 345. *fig. 1–9*. 1873; Hitchc., Brittonia 2: 129. 1936.

Culms tufted, erect, 50–70 cm. tall, simple, glabrous, the nodes bearded; sheaths mostly slightly shorter than the internodes, keeled above and more or less densely pilose; ligule membranous, 1–1.5 mm. long; blades flat, linear, 10–25 cm. long, 3–5 mm. wide, both surfaces pubescent to pilose; racemes (excluding the awns) 15–20 mm. long, 3–8 mm. wide, terete, stramineous to tawny; sessile spikelets about 18 mm. long, the first glume slightly shorter, truncate, emarginate, usually ciliate, the second glume and lemmas puberulent toward their tips; fertile spikelets brown-hirtellous, the awn about 6 cm. long, geniculate in the upper third, the column brownish hirsute.

BRITISH NEW GUINEA: Western Division: Wuroi, Oriomo River, alt. 10–30 m., *Brass 5727* (GH, US) (sporadic in small tufts on savannah ridges); Mabaduan, *Brass 6555* (A, US) (scattered in savannah forests); Wassi Kussa River, *Brass 8637* (A, US) (common on sub-acid soils of savannah forests); *MacGregor 7* (US). NETHERLANDS NEW GUINEA: Balim River, alt. 1600 m., *Brass 11722* (A, US) (usually dominant grass on sandy soil of deforested slopes).

India to China and New Guinea.

49. Heteropogon Pers.

Heteropogon Pers., Syn. Pl. 2: 533. 1807.

Spikelets in pairs, the lower 1-several pairs homogamous, staminate or neuter, imbricate, persistent along the continuous rachis, the remaining pairs heterogamous, one sessile, perfect or pistillate, terete, long-awned, the other pediceled, staminate or neuter, similar to the homogamous spikelets below, the upper part of the rachis disarticulating obliquely at the base of each joint and forming a sharp barbed callus below the fertile spikelet, the pediceled spikelet readily falling, its pedicel obscured in the hairs of the callus; staminate spikelets awnless, the glumes membranous; first glume asymmetrical, one submarginal keel rather broadly winged, the other wingless; second glume narrower, symmetrical; lemmas hyaline, epaleate; fertile spikelets terete, the glumes coriaceous, the first brown-hirsute, enfolding the second; lemmas hyaline; awn of the fertile spikelets stout, twice geniculate, twisted and hirsute below the upper bend. Perennials or annuals with solitary spikelike cylindrical racemes terminating the culms and upper branches.

TYPE SPECIES: *Heteropogon glaber* Pers. = *H. contortus* (L.) Beauv. (*Andropogon contortus* L.).

KEY TO THE SPECIES

1. Fertile spikelets 6–8 mm. long including the 2 mm. long callus; plants 30–90 cm. tall ..... 1. *H. contortus.*
1. Fertile spikelets 12–14 mm. long including the 6 mm. long callus; plants robust, 1.5–3 meters tall ..... 2. *H. triticeus.*

1. **Heteropogon contortus** (L.) Beauv. ex. Roem. & Schult., Syst. Veg. 2: 836. 1817; C. T. White, Proc. Roy. Soc. Queensl. 34: 15. 1923; Hitchc., Lingnan Sci. Jour. 7: 250. *pl. 11.* 1931, U. S. Dept. Agric. Misc. Publ. 200: 756. *fig. 1677.* 1935; Brittonia 2: 129. 1936.

Andropogon contortus L., Sp. Pl. 1045. 1753; F. Muell., Pap. Pl. 1: 46. 1876. Type from India.

Heteropogon hirtus Pers., Syn. Pl. 2: 533. 1807. Based on *Andropogon contortus* L.

Perennial; culms tufted, erect, branching above, 30–90 cm. tall; sheaths compressed-keeled, glabrous; ligule membranous, about 1 mm. long, ciliate; blades linear, flat or folded, 3–6 mm. wide, scaberulous at least above and on the margins; racemes 3–7 cm. long, dorsiventral, straight or slightly curved; sessile spikelets 6–8 mm. long including the 2 mm. long callus, pubescent, dark brown, nearly hidden by the imbricate pediceled spikelets, the awn 6–10 cm. long; sterile spikelets with the first glume papillose-hispid toward the margins and the tip or sometimes nearly glabrous.

BRITISH NEW GUINEA: Central Division: Rona, Laloki River, alt. 450 m., *Brass 3632* (GH, US) (one of the principal grasses of the lowland savannahs; not plentiful at this altitude); Kanosia, *Carr 11174* (NY) (open savannah land). NORTHEAST NEW GUINEA: Morobe District: Kajabit, *Clemens 10713e, 10515* (US).

Tropical and warmer regions of both hemispheres.

2. **Heteropogon triticeus** (R. Br.) Stapf, Kew Bull. 1912: 432. 1912; Chase, Jour. Arnold Arb. 20: 316. 1939.

Andropogon triticeus R. Br., Prodr. Fl. Nov. Holl. 1: 201. 1810; Hack. in DC., Monogr. Phan. 6: 588. 1889. Type from Australia.

Perennial; culms robust, erect, 1.5–3 meters tall, glabrous; sheaths glabrous or nearly so, the lower overlapping, compressed-keeled, the upper shorter than the internodes, rounded or somewhat keeled above; ligule 1–1.5 mm. long, membranous, irregularly ciliate; blades usually folded (at least when dry), 40–60 cm. long, gradually tapering to the attenuate apex, more or less scabrous, at least on the margins, the upper surface sometimes sparsely pilose; racemes dorsiventral, similar to those of *Heteropogon contortus*, but considerably larger, as much as 15 cm. long exclusive of the awns; sessile spikelet 12–14 mm. long, including the 6 mm. long callus, puberulent, dark brown, almost completely hidden by the imbricate pediceled spikelets, the awn stout, 10–16 cm. long; glumes of sterile spikelets glabrous.

BRITISH NEW GUINEA: Western Division: Mabaduan, *Brass 6538* (A, US) (of localized distribution on drier soils of savannah forest, dominant where it occurs).

India to Malaysia, Australia, and New Guinea.

A much larger, coarser, more robust species than *Heteropogon contortus*. The leaf blades are long, firm and attenuate, while those of *H. contortus* are usually flat and thinner in texture. The inflorescences of these two species are very similar, but that of *H. triticeus* is larger and coarser with larger spikelets.

Tribe III. MAYDEAE

Spikelets unisexual, dissimilar, awnless, the sexes in different inflorescences or in different parts of the same inflorescence, the pistillate below; staminate spikelets 2-flowered, usually paired, one sessile, the other pedi-

celed, in solitary or panicled spikelike racemes; sessile spikelets 2-flowered, the lower floret sterile, solitary or sometimes accompanied by a pediceled staminate spikelet, embedded in hollows of a thickened articulate axis, enclosed in a thickened sheath, or crowded in rows on a thickened axis (cob); glumes membranous or indurated, lemmas hyaline. Annuals or perennials with usually tall culms and broad flat leaves.

KEY TO THE GENERA

1. Staminate and pistillate spikelets in separate portions of the same inflorescence, the pistillate below.
   2. Spikes elongate, the pistillate portion several to many-flowered, disarticulating into as many 1-seeded joints.....50. *Polytoca.*
   2. Spikes short, the pistillate portion 1–3-flowered, permanently enclosed within a shiny bead-like sheathing bract.....51. *Coix.*
1. Staminate and pistillate spikelets in separate inflorescences, the staminate in a terminal panicle, the pistillate borne in axils of the leaves.....52. *Zea.*

50. **Polytoca** R. Br.

Polytoca R. Br. in Bennett, Pl. Jav. Rar. 20. *pl. 5.* 1838.

Spikelets unisexual, in the lower part of the raceme one sessile and pistillate, more or less sunken in the rachis, the other pediceled and staminate (in ours) or more or less reduced; spikelets in the upper part of the raceme all staminate (often the uppermost racemes entirely staminate); rachis of the staminate part of the raceme continuous, falling entire, of the lower pistillate part fragile, disarticulating into as many 1-seeded joints as there are spikelets; glumes of the staminate spikelets membranous or chartaceous, those of the pistillate spikelets coriaceous. Tall robust perennials with flat blades and terminal and lateral spikelike racemes borne in the upper sheaths.

TYPE SPECIES: *Polytoca barbata* R. Br. = *P. digitata* (L. f.) Henr. (*Apluda digitata* L. f.).

1. **Polytoca macrophylla** Benth., Jour. Linn. Soc. Bot. **19:** 52. 1881; Hack., Bot. Jahrb. **13:** 263. 1890; Henr., Med. Rijks Herb. Leiden **67:** 12. *fig. 1, 2.* 1931; Pilger, Nat. Pflanzenfam. ed. 2. **14e:** 186. 1940. Type from the Louisiade Archipelago.

Culms caespitose, robust, freely branching, 2–3 meters tall, erect or somewhat geniculate at base and rooting from the lower nodes; sheaths slightly shorter than the internodes, glabrous or more or less papillose-hispid near the margins; ligule wanting or very short; blades flat, as much as 90 cm. long and 8 cm. wide, smooth and glabrous, the margins scabrous; rachis joints in the lower part of the raceme 5–7 mm. long, clavate and somewhat concave on the side next to the sessile spikelet, more or less pubescent on the back, especially toward the base; pistillate spikelets lanceolate, more than 1 cm. long, the first glume glabrous but minutely papillose-roughened on the back above the smooth callus, scabrous on the upper margins; pedicels of the pediceled staminate spikelets fused to the rachis joint for more than half their length; staminate spikelets about as large as the pistillate in the lower part of the raceme, reduced in size upward.

BRITISH NEW GUINEA: Central Division: Rona, Laloki River, alt. 450 m., *Brass 3617* (GH, US) (rocky savannah slopes; tall erect species growing in clumps;

hairs stiff and irritant); Mafulu, alt. 1250 m., *Brass 5485* (US) (massed in an old native garden); Kanosia, *Carr 11344* (NY) (river bank); Gulf Division: Kerema, *Brass 1203* (GH, US) (open ridges near coast; tall clumps of grass 5 ft. high); Northern Division: About 13 miles northwest of Oro Bay, *Reeder 842* (A, US) (low ground at edge of swamp); Goodenough Island: Haiwali, *Burcham 126* (US) (edge of clearing in rain forest). NORTHEAST NEW GUINEA: Morobe District: Kajabit, Markham Valley, *Clemens 10552A* (US) (growing on stream margins; plants 10 ft. or more tall); Boana, *Clemens 41608* (US). NETHERLANDS NEW GUINEA: Mamberamo, Otken River, alt. about 60 m., *Docters van Leeuwen 11368* (GH, NY). BISMARCK ARCHIPELAGO: Duke of York Islands: *W. Bradthe 5* (US); New Britain: Rabaul, *Herre 198* (NY) (growing on roadsides; plants 10 ft. high). SOLOMON ISLANDS: San Cristoval: Waimamura, *Brass 2629* (GH) (on old village and garden clearings; blades to 8 cm. wide); Bougainville: Kugumaru, *Kajewski 1989* (GH) (a pest in native gardens).

Ternate to New Guinea and the Louisiade Archipelago.

The report by F. Muell. (Pap. Pl. 2: 20. 1885) of *Chionachne cyathopoda* (F. Muell.) Benth. = *Polytoca cyathopoda* (F. Muell.) Bailey is probably referable to this species.

51. Coix L.

Coix L., Sp. Pl. 972. 1753, Gen. Pl. ed. 5. 419. 1754.

Spikelets unisexual; staminate spikelets 2–flowered, in twos and threes on a slender continuous rachis; glumes membranous, lanceolate, obscurely nerved; lemmas and paleas hyaline, the stamens 3; pistillate spikelets 3 together, one fertile, the other two sterile and reduced to narrow tubular glumes; glumes of the fertile spikelet several-nerved, hyaline below, chartaceous in the upper pointed part, the first glume broad, enfolding the spikelet, the second narrower; sterile lemma similar but a little narrower; fertile lemma and palea hyaline; inflorescence consisting of an ovate, oval, or somewhat cylindrical pearly white or drab bead-like, very hard involucre (much modified sheathing bract) containing the pistillate portion of the inflorescence, the points of the pistillate spikelets and the slender axis of the staminate portion of the inflorescence protruding from the orifice at the apex, the staminate portion as much as 6 cm. long, soon deciduous. Annuals or perennials with branching culms and broad flat blades, the inflorescences numerous on stout peduncles clustered in the axils of the leaves.

TYPE SPECIES: *Coix Lacryma-Jobi* L.

1. **Coix Lacryma-Jobi** L., Sp. Pl. 972. 1753; Hack., Bot. Jahrb. 6: 237. 1885; Hitchc., U. S. Dept. Agric. Misc. Publ. 200: 765. *fig. 1691*. 1935; Pilger, Nat. Pflanzenfam. ed. 2. 14e: 190. *fig. 103*. 1940. Type from India.

   Coix Lacryma L., Syst. Nat. ed. 10. 1261. 1759 (presumably based on *C. Lacryma-Jobi* L.).

   Coix Lacryma-Jobi L. var. *novoguineensis* Pilger, Bot. Jahrb. 52: 171. 1914. Type from Northeast New Guinea.

Annual; culms erect, stout, much branched upwards, 1–3 meters tall; sheaths glabrous; ligule membranous, ciliate, about 1 mm. long; blades glabrous, narrowly lanceolate, often cordate at base, acute, 10–60 (the lower sometimes to 120) cm. long, 2–5 cm. wide, the margins serrate-scabrous; staminate racemes 1–6 cm. long, glabrous; spikelets 8–10 mm.

long, the first glume winged on the keels; false fruits ovoid-globose, 6–12 mm. long, hard and shiny at maturity.

BRITISH NEW GUINEA: Central Division: Javarie, *White 373* (US). NORTHEAST NEW GUINEA: Madang District: Sepik River, *Herre 322, 335* (NY) (plants 6–8 ft. high, growing in water). NETHERLANDS NEW GUINEA: Arfak Mountains, Female Lake, alt. about 3000 m., *Pratt* in 1908 (US); Nassau Region: Explorat Biv., alt. about 1200 m., *Docters van Leeuwen 10804* (GH). SOLOMON ISLANDS: Bougainville: Kugumaru, alt. 150 m., *Kajewski 1840* (GH) (rainforest; tall grass up to 2 meters tall).

Warmer regions of the world. Sometimes cultivated for the "beads," which are used as ornaments, or for the edible grains.

1a. **Coix Lacryma-Jobi** L. var. **stenocarpa** (Oliver) Stapf in Hook. f., Fl. Brit. Ind. 7: 100. 1897.

Coix Lachryma L. var. *stenocarpa* Oliver, Hook. Ic. 18: *pl. 1764*. 1888. Type from Burma.

Coix stenocarpa (Oliver) Balansa, Jour. de Bot. 4: 77. 1890. Type from Burma.

Coix tubulosa Hack., Bot. Jahrb. 13: 260. 1890. Type from Northeast New Guinea.

Coix Lacryma-Jobi L. var. *tubulosa* (Hack.) K. Schum. in K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 164. 1901.

Differs from the species in having nearly cylindrical rather than ovate or elliptical false fruits. In the specimen cited below the false fruits are about 3.5 mm. in diameter and 10–12 mm. long.

BRITISH NEW GUINEA: Eastern Division: Aisa River, *Brass 1417* (GH) (tall riverbank grass 5–6 ft. tall; fruit glossy, gray).

Indo-Malayan region to New Guinea.

52. Zea L.

Zea L., Sp. Pl. 971. 1753, Gen. Pl. ed. 5. 419. 1754.

Spikelets unisexual; staminate spikelets 2-flowered, in pairs on a rather slender trigonous continuous rachis, one of the pair nearly sessile, the other pediceled; glumes membranous, acute; lemmas and paleas hyaline, the stamens 3; pistillate spikelets 1-flowered, densely crowded in many vertical rows on a cylindrical spongy rachis (cob); glumes broad, rounded or emarginate at apex; lemmas hyaline, the styles filiform, very long and slender, stigmatic nearly to the base. Robust annuals with terminal panicles of staminate racemes and axillary short-peduncled pistillate spikes (ears) enclosed in numerous sheaths (husks), the styles protruding from the end as a mass of silky threads.

TYPE AND ONLY SPECIES: *Zea Mays* L.

1. **Zea Mays** L., Sp. Pl. 971. 1753; Kärnbach, Bot. Jahrb. 16: Beibl. 37: 11. 1892; K. Schum. & Lauterb., Nachtr. Fl. Deutsch. Schutzgeb. Südsee 56. 1905; Pilger, Nat. Pflanzenfam. ed. 2. **14e:** 194–201. *fig. 106*. 1940. Type from America.

Culms erect, robust, more or less succulent, 1–4 meters tall, unbranched, the basal internodes very short, the lower nodes giving rise to adventitious "prop roots"; blades broad and flat, sword-shaped, the midrib prominent.

Widely distributed, in cultivation, in temperate and tropical regions of the world. Known only in cultivation.

Numerous species have been described, but most botanists consider that *Zea* is monotypic but highly variable. No herbarium specimens of this species from New Guinea have been seen, but living plants were

observed in native gardens there by the writer in 1943–44. To what extent this species is cultivated by natives in New Guinea is unknown to me.

DOUBTFUL AND EXCLUDED SPECIES

Andropogon australis Spreng. sensu K. Schum., Notizbl. Bot. Gart. Berlin 1: 207. 1896 = *Sorghum*.

Probably a misidentification of *Sorghum nitidum*.

Andropogon australis Spreng. var. *laeviramis* Hack. apud K. Schum., Bot. Jahrb. 9: 197. 1887.

As far as I can discover, the above is a *nomen nudum*. Schumann and his co-workers used the name on at least three occasions, but a description was never published.

Andropogon halepensis Sibth. var. *propinquus* (Kunth) Hack., Bot. Jahrb. 6: 240. 1885, in Engler, Forschungsreise Gazelle 4(7): 5. 1889.

The above record from the New Guinea region probably represents a misidentification for *Sorghum nitidum*. The latter species is common in the region and is picked up by most collectors. I have seen no specimens of *S. propinquus* from New Guinea. A further reason for believing that the plants were *S. nitidum* is the fact that, although common, *S. nitidum* was not reported by the above authors.

Andropogon Sorghum (L.) Brot. subsp. *halepensis* (L.) Hack. var. *propinquus* (Kunth) Hack. in DC., Monogr. Phan. 6: 503. 1889; K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 173. 1901.

See note under *Andropogon halepensis* var. *propinquus*.

Anthistiria ciliata L. f. sensu F. Muell., Pap. Pl. 1: 47. 1876.

According to C. T. White (75, p. 15) the specimen which Mueller cites under this name is *A. imberbis* Retz. = *Themeda triandra* Forsk.

Arthraxon linifolius Henr., Blumea 4: 525. 1941.

No specimens of this nor of the following species were available to me. From Henrard's descriptions they seem to be very close to *A. hispidus*.

Arthraxon pallidus Henr., Blumea 4: 526. 1941.

See comment above.

Chrysopogon Gryllus (L.) Trin. sensu F. M. Bailey, Queensl. Agric. Jour. 23: 220. 1909.

This species has not been reported otherwise from New Guinea. I am not certain which species Bailey had, but it was probably *C. elongatus* or even *C. aciculatus*.

Erianthus pedicellaris (Trin.) Hack. sensu K. Schum., Notizbl. Bot. Gart. Berlin 1: 46. 1895.

This is the only report of this species from the region. Perhaps it represents a misidentification.

Eriochloa punctata (L.) Desv. sensu F. Muell., Pap. Pl. 1: 74. 1876; C. T. White, Proc. Roy. Soc. Queensl. 34: 15. 1923.

Probably the plants referred to this species are *E. procera* (Retz.) C. E. Hubb. I have seen no specimens of *E. punctata* from New Guinea.

Ischaemum aristatum L. var. *arfakense* Rendle in Gibbs, Contr. Phytogr. Fl. Arfak Mt. 89. 1917.

From the description this appears to be merely a synonym of *I. aristatum* L. (sensu meo) as applied to the New Guinea material.

Ischaemum aristatum L. var. *cylindricum* Pilger, Bot. Jahrb. 52: 171. 1914.

Unfortunately no specimens of *I. aristatum* were available from this region (Northeast New Guinea). The description suggests that this variety may be a synonym of *I. aristatum* L. subsp. *barbatum* Hack.

Ischaemum chordatum (Trin.) Hack., Bot. Jahrb. 13: 260. 1890; K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 170. 1901.

Spodiopogon chordatum Trin., Mém. Acad. St. Pétersb. VI. 2: 302. 1832. Marianas and Carolines.

From Trinius' rather lengthy description, this species appears to be a synonym of *I. digitatum* Brongn.

Ischaemum rugosum Salisb. sensu Ridley, Trans. Linn. Soc. II. Bot. 9: 249. 1916.

I have seen no specimens nor do I know of any other record of this species from New Guinea. Ridley states that his plant is a dwarf about 15 cm. tall.

Microstegium calochloum (Lauterb. & K. Schum.) Pilger, Nat. Pflanzenfam. ed. 2. 14e: 122. 1940.

Pollinia calochloa Lauterb. & K. Schum. in K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 167. 1901. Type from Northeast New Guinea.

No New Guinea specimens examined match the description precisely, but from the ample description it seems to be only a variety of *Microstegium ciliatum* (Trin.) A. Camus. The ligule is said to be only about 0.5 mm. long, and the rachis joints are completely glabrous. The remainder of the description applies to *Pollinia ciliata* Trin. (sensu Hack. in DC., Monogr. Phan. 6: 176. 1889).

Microstegium glabratum (Brongn.) A. Camus, Ann. Soc. Linn. Lyon 68: 201. 1921; Ohwi, Bot. Mag. (Tokyo) 56: 10. 1942.

Eulalia glabrata Brongn. in Duperry, Bot. Voy. Coquille 93. *pl. 19*. 1831. Type from the Society Islands.

Pollinia glabrata (Brongn.) Trin., Mém. Acad. St. Pétersb. VI. 4: 89. 1836.

From Brongniart's description and figure, this species appears to be closely related to *Microstegium nudum* (Trin.) A. Camus, and I suspect it may be a synonym. The two species follow one another in Hackel's Monograph, and the distinctions separating them in that work seem very slight.

Panicum brevifolium L. sensu F. Muell., Pap. Pl. 2: 19. 1855.

This species was reported from New Guinea only by F. von Mueller in 1885. I have seen no reports from New Guinea since that date and suspect that it was probably a misidentification. Perhaps Mueller's plant was *Cyrtococcum patens* (L.) A. Camus, as that species bears a superficial resemblance to *Panicum brevifolium*.

Panicum filiforme L. sensu K. Schum., Notizbl. Bot. Gart. Berlin 1: 208. 1896 = *Digitaria filiformis* (L.) Koel.

This species was originally described from North America. I know of no other record of this plant from the New Guinea area. Perhaps Schumann's plant was *D. violascens* Link, which is common in the region. It is listed by Schumann as being a common weed of cultivated ground.

Panicum foliosum R. Br. sensu K. Schum., Bot. Jahrb. 9: 196. 1887 = *Brachiaria foliosa* (R. Br.) Hughes.

Reported from Finschhafen by Schumann. I know of no other record. It seems somewhat unlikely that this Australian species should occur in Northeast New Guinea and yet not be represented in the numerous collections which have been made on the Australian side of British New Guinea. Perhaps this represents a misidentification of *Brachiaria subquadripara* (Trin.) Hitchc.

Panicum interruptum Willd. sensu Ridley, Trans. Linn. Soc. II. Bot. 9: 248. 1916.

From a fragment of the type specimen (at US), consisting of two somewhat crushed spikelets, this species seems referable to *Sacciolepis*. This is the only report of the species from New Guinea known to me.

Panicum javanicum Poir. sensu Burkill, Proc. Camb. Phil. Soc. 9: 93. 1896; K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 177. 1901.

The original description is too inadequate to permit positive identification. Trinius (Mém. Acad. St. Pétersb. VI. 3: 243. 1834) lists *Urochloa panicoides* Beauv. as a synonym. Hooker f. (Fl. Brit. Ind. 7: 36. 1896), in a note under *P. javanicum*, states: "Kunth (Revis. Gram. i. 206) says, under *Urochloa panicoides*, that he has examined in Desfontaine's Herbarium the type of Poiret's *P. javanicum*, and identified it, which he cites as a syn. of *Urochloa panicoides*, but his figure of which again quite accords with a narrow-leaved form of *P. Helopus*, Trin. This requires the adoption [of] the name *javanicum* (by misprint *japonicum* in Kunth Revis.), for the species. Bentham, on the other hand (Fl. Austral. vii. 477), says that Munro has seen an authentic specimen of *javanicum*, and that it is quite distinct from *P. Helopus*. I have no means of verifying either authority."

Hitchcock (Jour. Wash. Acad. Sci. 9: 551. 1919) confidently states that *P. javanicum* Poir. is a synonym of *Panicum panicoides* (Beauv.) Hitchc. (*Urochloa panicoides* Beauv.). He states that since *P. javanicum* Poir. is described as having glabrous spikelets, and Beauvois' figure of *Urochloa panicoides* accompanying the original description shows the spikelets to be glabrous, they are synonyms. He further states that *P. Helopus* has pubescent spikelets and is thus excluded from consideration. It is interesting to note that all the specimens in the U.S. National Herbarium which have been labeled *P. javanicum* are from India — none are from Java. This leaves some doubt, I think, as to the identity of *P. javanicum*. Since C. E. Hubbard & Vaughan (39, p. 74) state under *Urochloa panicoides* that specimens of this species have been referred to *Panicum javanicum* Poir., it seems apparent that these authors do not agree with Hitchcock's interpretation.

Panicum multinode Lam. sensu F. Muell., Pap. Pl. 1: 31. 1876.

Mueller states that this seems referable to *P. repens* L. I have seen no specimens of this latter species from New Guinea. *Panicum multinode* Lam. is referable to the genus *Cyrtococcum*, which bears little resemblance to *Panicum repens*. Without seeing the actual specimens (of which none are cited by Mueller) it is impossible to determine to what species Mueller's report applies.

Panicum papuanum Mez, Bot. Jahrb. 56: Beibl. 125: 5. 1921.

Mez' original description is brief and quite inadequate. He states merely "Laminae anguste lineares. Nodi glabri. Inflorescentia laxe 3-pinnata. Spiculae quam pedicelli gracillimi breviores, glabrae, ellipticae, acutae, 2 mm. longae. Glumae I., II. = 7-, III. = 9-nervia. Flos inferior abortivus palea minuta. Palea floris herm. stramineae, politissimae." The specimen questionably referred to this species by Chase (17, p. 309) is *Panicum mindanaense* Merr. In that specimen both glumes and the sterile lemma are 5-nerved.

Panicum parviflorum R. Br. sensu K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 177. 1901 = *Digitaria parviflora* (R. Br.) Hughes.

This Australian species is reported from New Guinea only in Schumann's publications and probably represents a misidentification of another species such as *D. violascens*.

Panicum plicatum Lam. sensu F. Muell., Vict. Nat. 2: 20. 1855; Ridley, Trans. Linn. Soc. Bot. 9: 248. 1916; C. T. White, Proc. Roy. Soc. Queensl. 34: 16. 1923.

This is probably the species which I am calling *Setaria palmaefolia*. *Setaria plicata* (Lam.) T. Cooke is considered to be distinct by some authors, but the differences seem slight. I am not citing it as a synonym of *S. palmaefolia* pending further study.

Panicum trachyrachis Benth. sensu Hack., Bot. Jahrb. 13: 258. 1890; K. Schum., Notizbl. Bot. Gart. Berlin 2: 92. 1898.

An Australian species related to *P. virgatum* L. Reported by the German workers from Northeast New Guinea and the Bismarck Archipelago. The species may well occur in New Guinea, but I have seen no specimens.

Panicum virgatum L. sensu F. Muell., Pap. Pl. 1: 47. 1876; F. M. Bailey, Queensl. Agric. Jour. 9: 411. 1901.

This is the species which Bentham calls *P. trachyrachis* Benth. (See note under that species.)

Paspalum foliosum (R. Br.) K. Schum. & Hollr., Fl. Kais. Wilhelmsland 21. 1889.

Obviously an error for *Panicum foliosum* R. Br. = *Digitaria foliosa* (R. Br.) Hughes.

Paspalum miliare (Lam.) K. Schum. & Hollr., Fl. Kais. Wilhelmsland 21. 1889.

An error for *Panicum miliare* Lam. In K. Schum. & Lauterb. (69, p. 179), *P. miliare* sensu K. Schum. in Fl. Kais. Wilhelmsland (non Lam.) is listed as a synonym under *Panicum caesium* Nees = *P. cambogiense* Balansa.

Paspalum parviflorum (R. Br.) K. Schum. & Hollr., Fl. Kais. Wilhelmsland 21. 1889 = *Digitaria parviflora* (R. Br.) Hughes.

Obviously an error in copying *Panicum parviflorum*. See note under that species.

Pennisetum cenchroides (L.) Rich. sensu F. M. Bailey, Queensl. Agric. Jour. 23: 220. 1909 = *Pennisetum ciliare* (L.) Link.

This species occurs in Australia and, although I have seen no specimens, perhaps also in New Guinea. The above is the only record from New

Guinea known to me. C. T. White (75, p. 16) says Bailey's plant is *Cenchrus echinatus* L.

Rottboellia brevis Chauvin ex Steud., Syn. Pl. Glum. 1: 361. 1854.

This species was described from a specimen collected on the island of Waigiou. Hackel (23, p. 313) lists it under "species inextricabilis." I have no further information.

Rottboellia Coelorachis Forst. sensu Hack. in Engler, Forschungsreise Gazelle 4(7): 4. 1889.

According to Hackel (23, p. 294) and Pilger (59, p. 138) this is a distinct species from *R. exaltata*. I have seen no specimens which I could segregate.

Setaria aurea Hochst. sensu Hack., Denkschr. Akad. Wiss. Math.-Naturw. (Wien) 89: 495. 1913.

This is apparently the species which I am calling *Setaria pallide-fusca* (Schum.) Stapf & Hubb., as there are some sheets in the U.S. National Herbarium labeled *S. aurea* which seem to be *S. pallide-fusca*.

Setaria verticillata (L.) Beauv. sensu K. Schum., Notizbl. Bot. Gart. Berlin 2: 94. 1898.

The above is the only report of this species from the New Guinea region known to me. It may well occur there, but I have seen no specimens.

Stenotaphrum subulatum Trin. sensu Hack., Bot. Jahrb. 6: 237. 1885; F. Muell., Pap. Pl. 6: 19. 1885; K. Schum., Bot. Jahrb. 9: 196. 1887.

The above reports were all based on a single collection. No other report of this species from New Guinea is known to me. It is perhaps a misidentification or the locality of the specimen may be erroneous.

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LIST OF CITED SPECIMENS

Armit, W. 44. *Themeda gigantea* var. *novoguineensis;* 55. *Imperata exaltata.*

Arnot, W. E. 38. *Digitaria Baileyi.*

Baim, T. C. —. *Pogonatherum paniceum* (March 12, 1943).

Bauerlen, W. 40. *Echinochloa colonum;* 43. *Pogonatherum paniceum;* 60. *Erianthus arundinaceus;* 61. *Panicum cambogiense.*

Bradthe, W. 5. *Polytoca macrophylla.*

Brass, L. J. 514. *Ischaemum muticum;* 521. *Paspalum longifolium;* 522. *Apluda mutica;* 538. *Pennisetum macrostachyum;* 634. *Themeda gigantea* var. *amboinensis;* 765. *Themeda triandra;* 768. *Pogonatherum paniceum;* 776. *Rottboellia rottboellioides;* 920. *Miscanthus floridulus;* 1018. *Isachne Brassii;* 1177. *Ischaemum muticum;* 1183. *Paspalum scrobiculatum;* 1203. *Polytoca macrophylla;* 1205. *Themeda gigantea* var. *amboinensis;* 1213. *Ischaemum digitatum* var. *polystachyum;* 1229. *Paspalum vaginatum;* 1391. *Pogonatherum paniceum;* 1397. *Elyonurus citreus;* 1417. *Coix Lacryma-Jobi* var. *stenocarpa;* 1423. *Cyrtococcum oxyphyllum;* 1534. *Oplismenus hirtellus;*

1616. *Ischaemum muticum;* 2551. *Themeda triandra;* 2593. *Ischaemum littorale;* 2629. *Polytoca macrophylla;* 2646. *Ischaemum muticum;* 2732. *Cyrtococcum oxyphyllum;* 2813bis. *Ischaemum littorale;* 2817. *Paspalum conjugatum;* 2841. *Paspalum orbiculare;* 2857. *Themeda gigantea* var. *amboinensis;* 2857A. *Cyrtococcum oxyphyllum;* 2893. *Pogonatherum paniceum;* 3070. *Thuarea involuta;* 3126. *Themeda gigantea* var. *amboinensis;* 3241. *Themeda triandra;* 3386. *Pogonatherum paniceum;* 3405. *Isachne Schmidtii;* 3518. *Themeda gigantea;* 3558. *Andropogon micranthus;* 3586. *Ophiuros exaltatus;* 3589. *Themeda gigantea* var. *novoguineensis;* 3610. *Pennisetum macrostachyum;* 3613. *Apluda mutica;* 3617. *Polytoca macrophylla;* 3628. *Saccharum spontaneum;* 3629. *Sorghum nitidum;* 3631. *Panicum viale;* 3632. *Heteropogon contortus;* 3639. *Brachiaria fusiformis;* 3647. *Oplismenus hirtellus;* 3692. *Themeda triandra;* 3701. *Hackelochloa granularis;* 3702. *Rottboellia rottboellioides;* 3710. *Themeda gigantea* var. *novoguineensis;* 3713. *Cymbopogon procerus;* 3723. *Themeda triandra;* 3724. *Ophiuros exaltatus;* 3820. *Cyrtococcum oxyphyllum;* 3935. *Paspalum conjugatum;* 4132. *Isachne villosa;* 4191. *Miscanthus floridulus;* 4528. *Miscanthus floridulus;* 4642. *Isachne Myosotis;* 4721. *Imperata exaltata* subsp. *Merrillii;* 4723. *Miscanthus floridulus;* 4778. *Miscanthus floridulus;* 4787. *Arthraxon hispidus;* 4788. *Setaria montana;* 4789. *Sacciolepis indica;* 4792. *Setaria palmaefolia;* 4799. *Andropogon micranthus;* 4802. *Dimeria dipteros;* 4807. *Isachne globosa;* 4808. *Ischaemum digitatum* var. *polystachyum;* 4813. *Imperata exaltata;* 4817. *Hyparrhenia bracteata;* 4871. *Isachne arfakensis;* 5208. *Panicum sarmentosum;* 5270. *Pogonatherum paniceum;* 5310. *Rottboellia rottboellioides;* 5403. *Apluda mutica;* 5482. *Setaria pallide-fusca;* 5483. *Sacciolepis indica;* 5485. *Polytoca macrophylla;* 5513. *Pennisetum macrostachyum;* 5522. *Digitaria pruriens;* 5532. *Ischaemum digitatum* var. *polystachyum;* 5594. *Cyrtococcum oxyphyllum;* 5617. *Cyrtococcum patens;* 5710. *Eulalia trispicata;* 5725. *Cymbopogon procerus;* 5726. *Ischaemum aristatum;* 5727. *Germainia capitata;* 5733. *Eulalia irritans;* 5735. *Ophiuros exaltatus;* 5740. *Setaria pallide-fusca;* 5743. *Eremochloa bimaculata;* 5744. *Sacciolepis indica;* 5745. *Alloteropsis semialata;* 5827. *Sacciolepis indica;* 5828. *Panicum distans;* 5854. *Isachne confusa;* 5873. *Themeda triandra;* 5895. *Sorghum nitidum;* 5910. *Brachiaria holosericea;* 5911. *Dimeria ciliata;* 5922. *Paspalum longifolium;* 5923. *Panicum Archboldii;* 5926. *Eulalia trispicata;* 5927. *Themeda triandra;* 5928. *Ischaemum aristatum* subsp. *barbatum;* 5957. *Apluda mutica;* 5960. *Panicum mindanaense;* 5961. *Ischaemum fragile;* 5984. *Dimeria glabriuscula;* 5985. *Andropogon brevifolius;* 6001. *Hemarthria subulata;* 6014. *Thaumastochloa rariflora;* 6029. *Sacciolepis myosuroides;* 6040. *Ischaemum aristatum* subsp. *barbatum;* 6044. *Echinochloa colonum;* 6045. *Chrysopogon elongatus;* 6060. *Echinochloa crusgalli;* 6252. *Sorghum nitidum;* 6253. *Ischaemum aristatum* subsp. *barbatum;* 6254. *Rottboellia rottboellioides;* 6260. *Panicum nodosum;* 6269. *Themeda triandra;* 6270. *Setaria pallide-fusca;* 6283. *Chrysopogon elongatus;* 6285. *Paspalum vaginatum;* 6295. *Cyrtococcum patens;* 6296. *Rottboellia exaltata;* 6297. *Paspalum scrobiculatum;* 6300. *Echinochloa colonum;* 6301. *Brachiaria subquadripara;* 6303. *Panicum reptans;* 6305. *Digitaria pruriens;* 6339. *Ischaemum digitatum;* 6341. *Paspalum longifolium;* 6342. *Panicum Archboldii;* 6343. *Alloteropsis semialata;* 6350. *Panicum macrocladum;* 6364. *Cymbopogon procerus;* 6382. *Themeda gigantea* var. *amboinensis;* 6387. *Panicum distans;* 6395. *Cenchrus Brownii;* 6397. *Pennisetum macrostachyum;* 6404. *Andropogon annulatus;* 6408. *Paspalum vaginatum;* 6410. *Ischaemum muticum;* 6426. *Chrysopogon aciculatus;* 6431. *Apluda mutica;* 6474. *Themeda frondosa;* 6484. *Panicum Archboldii;* 6485. *Panicum mindanaense;* 6486. *Ischaemum fragile;* 6524. *Eulalia irritans;* 6537. *Ophiuros exaltatus;* 6538. *Heteropogon triticeus;* 6554. *Thaumastochloa rariflora;* 6555. *Germainia capitata;* 6568. *Panicum macrocladum;* 6582. *Erianthus arundinaceus;* 6585. *Echinochloa stagnina;* 6810. *Pogonatherum paniceum;* 6945. *Imperata exaltata;* 6948. *Paspalum scrobiculatum;* 6957. *Saccharum spontaneum;* 6961. *Sacciolepis indica;* 7364. *Isachne Brassii;* 7483. *Oplismenus hirtellus;* 7519. *Sacciolepis indica;* 7522. *Panicum mindanaense;* 7528. *Ischaemum digitatum;* 7529. *Paspalum scrobiculatum;* 7552. *Hemarthria subulata;* 7600. *Pseudoraphis squarrosa;* 7602. *Isachne*

globosa; 7613. *Hymenachne amplexicaulis;* 7643. *Ophiuros exaltatus;* 7644. *Sorghum nitidum;* 7645. *Eulalia irritans;* 7647. *Panicum paludosum;* 7768. *Themeda gigantea* var. *amboinensis;* 7771. *Apluda mutica;* 7773. *Cyrtococcum patens;* 7806. *Dimeria monostachya;* 7807. *Dimeria ciliata* var. *heteromorpha;* 7808. *Eremochloa ciliaris* var. *elata;* 7809. *Eulalia trispicata;* 7810. *Brachiaria holosericea;* 7812. *Andropogon brevifolius;* 7832. *Isachne confusa;* 7849. *Eremochloa ciliaris* var. *elata;* 7850. *Dimeria glabriuscula;* 7851. *Panicum mindanaense;* 7852. *Panicum mindanaense;* 7854. *Sacciolepis myosuroides;* 7874. *Ischaemum fragile;* 7880. *Sacciolepis indica;* 7883. *Setaria pallide-fusca;* 7889. *Cyrtococcum patens;* 7900. *Ischaemum aristatum;* 7920. *Elyonurus citreus;* 7924. *Alloteropsis semialata;* 7932. *Dimeria ciliata* var. *heteromorpha;* 7933. *Andropogon sanguineus;* 7934. *Ischaemum fragile;* 7950. *Eulalia trispicata;* 7957. *Panicum sarmentosum;* 8220. *Pogonatherum paniceum;* 8251. *Eulalia irritans;* 8254. *Rottboellia rottboellioides;* 8259. *Ischaemum aristatum;* 8260. *Ischaemum aristatum* subsp. *barbatum;* 8263. *Sorghum nitidum;* 8279. *Eulalia trispicata;* 8280. *Echinochloa crusgalli;* 8296. *Imperata cylindrica* var. *major;* 8302. *Paspalum scrobiculatum;* 8324. *Digitaria radicosa;* 8325. *Paspalum conjugatum;* 8343. *Panicum distans;* 8351. *Sacciolepis indica;* 8370. *Cymbopogon procerus;* 8408. *Eremochloa bimaculata;* 8409. *Alloteropsis semialata;* 8460. *Chrysopogon filipes* var. *arundinaceus;* 8470. *Pseudoraphis squarrosa;* 8537. *Sclerandrium truncatiglume;* 8566. *Eulalia trispicata;* 8567. *Sorghum nitidum;* 8579. *Chrysopogon elongatus;* 8637. *Germainia capitata;* 8654. *Panicum marginatum;* 8665. *Sclerandrium truncatiglume;* 8695. *Digitaria Baileyi;* 8696. *Panicum distans;* 8697. *Eulalia trispicata;* 8713. *Sacciolepis indica;* 8735. *Cleistochloa Sclerachne;* 8751. *Ischaemum aristatum;* 8776. *Sacciolepis indica;* 8782. *Themeda gigantea* var. *novoguineensis;* 8787. *Andropogon annulatus;* 8815. *Ischaemum aristatum* subsp. *barbatum;* 8893. *Pennisetum macrostachyum;* 8909. *Ichnanthus vicinus;* 8920. *Saccharum spontaneum;* 9556. *Isachne Myosotis;* 10235. *Imperata exaltata* subsp. *Merrillii* [with E. Meyer-Drees]; 10704. *Isachne Myosotis;* 10735. *Arthraxon hispidus;* 10736. *Sacciolepis indica;* 10743. *Isachne globosa;* 10746. *Setaria montana;* 10901. *Eulalia leptostachys;* 10902. *Imperata exaltata* subsp. *Merrillii;* 11363. *Eulalia leptostachys;* 11374. *Saccharum spontaneum;* 11385. *Ischaemum digitatum;* 11471. *Setaria palmaefolia;* 11488. *Setaria montana;* 11491. *Imperata exaltata* subsp. *Merrillii;* 11524. *Sacciolepis indica;* 11542. *Isachne globosa;* 11559. *Isachne albens;* 11568. *Pogonatherum paniceum;* 11583. *Isachne Myosotis;* 11584. *Miscanthus floridulus;* 11616. *Andropogon spicigerus;* 11617. *Ischaemum pubescens;* 11618. *Sorghum nitidum;* 11631. *Pogonatherum paniceum;* 11678. *Themeda gigantea* var. *amboinensis;* 11722. *Germainia capitata;* 11723. *Andropogon brevifolius;* 11732. *Ischaemum pubescens;* 11738. *Dimeria dipteros;* 11777. *Pennisetum macrostachyum;* 11778. *Saccharum spontaneum;* 11793. *Echinochloa crusgalli;* 11798. *Apluda mutica;* 11803. *Echinochloa crusgalli;* 11805. *Andropogon spicigerus;* 11806. *Ischaemum digitatum;* 11809. *Miscanthus floridulus;* 11813. *Digitaria radicosa;* 11814. *Setaria montana* [specimen at A]; 11814. *Setaria pallide-fusca* [specimen at US]; 11817. *Paspalum scrobiculatum;* 11822. *Digitaria violascens;* 11823. *Isachne globosa;* 11824. *Sacciolepis indica;* 11825. *Eulalia leptostachys;* 11845. *Andropogon spicigerus;* 12364. *Oplismenus hirtellus;* 12370. *Isachne villosa;* 12475. *Isachne villosa;* 13201. *Isachne Myosotis;* 13210. *Ichnanthus vicinus;* 13263. *Setaria palmaefolia;* 13264. *Saccharum spontaneum;* 13479. *Pogonatherum paniceum;* 13719. *Oplismenus hirtellus;* 13720. *Microstegium spectabile;* 13721. *Ischaemum digitatum* var. *polystachyum;* 13784. *Paspalum scrobiculatum;* 13785. *Echinochloa stagnina;* 13791. *Saccharum spontaneum;* 13942. *Panicum auritum;* 13946. *Panicum zizanioides;* 14055. *Isachne Brassii.*

Britton, M. E. 22. *Setaria italica.*

Burcham, L. T. 119. *Apluda mutica;* 120. *Digitaria pruriens;* 121. *Sorghum nitidum;* 122. *Paspalum scrobiculatum* var. *bispicatum;* 124. *Rottboellia rottboellioides;* 125. *Setaria pallide-fusca;* 126. *Polytoca macrophylla;* 128. *Panicum nodosum;* 129. *Paspalum scrobiculatum;* 130. *Paspalum orbiculare;* 131. *Alloteropsis semialata;* 133. *Setaria palmaefolia;* 134. *Paspalum paniculatum;* 135. *Cyrtococcum patens;* 136. *Chrysopogon aciculatus;* 137. *Oplismenus compositus;* 138. *Oplismenus hirtellus;*

139. *Cyrtococcum oxyphyllum;* 140. *Ischaemum digitatum* var. *polystachyum;* 141. *Andropogon micranthus.*

CARR, C. E. 11022. *Echinochloa colonum;* 11025. *Paspalum conjugatum;* 11031. *Digitaria pruriens;* 11032. *Panicum nodosum;* 11033. *Chrysopogon aciculatus;* 11048. *Panicum viale;* 11054. *Alloteropsis semialata;* 11091. *Panicum reptans;* 11104. *Panicum viale;* 11106. *Andropogon micranthus* var. *muticispiculus;* 11108. *Digitaria abortiva;* 11111. *Sorghum nitidum;* 11129. *Saccharum spontaneum;* 11133. *Themeda triandra;* 11134. *Ophiuros exaltatus;* 11135. *Sorghum nitidum;* 11180. *Cenchrus echinatus;* 11235. *Themeda gigantea* var. *novoguineensis;* 11244. *Imperata exaltata;* 11309. *Andropogon micranthus* var. *muticispiculus;* 11329. *Andropogon intermedius;* 11344. *Polytoca macrophylla;* 11345. *Pogonatherum paniceum;* 11355. *Setaria palmaefolia;* 11382. *Setaria surgens;* 11398. *Brachiaria subquadripara* var. *piligera;* 11413. *Ischaemum muticum;* 11417. *Thuarea involuta;* 11435. *Eriochloa procera;* 11439. *Digitaria sanguinalis;* 11440. *Digitaria pruriens;* 11445. *Spinifex littoreus* var. *longifolius;* 11503. *Cyrtococcum patens* var. *Warburgii;* 11546. *Alloteropsis semialata;* 11622. *Panicum creperum;* 11658. *Pennisetum macrostachyum;* 11736. *Ischaemum digitatum;* 11741. *Apluda mutica;* 11771. *Cyrtococcum oxyphyllum;* 11786. *Cyrtococcum oxyphyllum;* 11964. *Cyrtococcum trigonum;* 12236. *Microstegium spectabile;* 12362. *Isachne pauciflora;* 12412. *Isachne Myosotis;* 12525. *Panicum sarmentosum;* 12941. *Cyrtococcum oxyphyllum;* 12971. *Isachne Myosotis;* 14271. *Isachne villosa.*

CHALMERS, REV. J. 42. *Panicum sarmentosum;* 59. *Cyrtococcum oxyphyllum;* 71. *Eulalia irritans;* 72. *Panicum sarmentosum.*

CLEMENS, M. S. 34. *Sorghum laxiflorum;* 312. *Isachne Myosotis;* 1410. *Saccharum spontaneum;* 4053. *Sacciolepis indica;* 4105. *Isachne albens;* 4280. *Panicum ambiguum;* 4303. *Panicum sarmentosum;* 4307. *Hackelochloa granularis;* 4315. *Sacciolepis indica;* 4332. *Ichnanthus vicinus;* 4454. *Miscanthus floridulus;* 4498. *Setaria montana;* 4592. *Isachne albens;* 4725. *Eulalia leptostachys;* 4775. *Echinochloa crusgalli;* 4860. *Isachne villosa;* 4956. *Isachne villosa;* 5409. *Isachne albens;* 5476. *Echinochloa crusgalli;* 5756. *Oplismenus hirtellus;* 5856. *Isachne villosa;* 5924. *Isachne villosa;* 6097. *Isachne Myosotis;* 6120. *Digitaria perpusilla;* 6145. *Miscanthus floridulus;* 6548a. *Pogonatherum paniceum;* 6558. *Saccharum spontaneum;* 6958a. *Isachne albens;* 9209. *Isachne arfakensis;* 9239. *Isachne albens;* 10279. *Microstegium nudum;* 10359. *Digitaria violascens;* 10379. *Isachne albens;* 10441. *Sorghum laxiflorum;* 10458. *Andropogon micranthus;* 10459bis. *Alloteropsis semialata;* 10475. *Panicum reptans;* 10476-s. *Echinochloa colonum;* 10477. *Andropogon brevifolius;* 10515. *Heteropogon contortus;* 10540J. *Setaria pallide-fusca;* 10541. *Andropogon micranthus* var. *muticispiculus;* 10541bis. *Andropogon micranthus;* 10552. *Pogonatherum paniceum;* 10552A. *Polytoca macrophylla;* 10568. *Oplismenus compositus;* 10630. *Digitaria pruriens;* 10631. *Apluda mutica;* 10650. *Echinochloa crusgalli;* 10665. *Sorghum nitidum;* 10668b. *Imperata cylindrica* var. *major;* 10696. *Panicum paludosum;* 10706. *Paspalum longifolium;* 10713e. *Heteropogon contortus;* 10857. *Eulalia leptostachys;* 10955bis. *Sacciolepis indica;* 10980. *Sorghum laxiflorum;* 11047. *Paspalum orbiculare;* 11272. *Cyrtococcum patens;* 40782. *Hackelochloa granularis;* 40793. *Pennisetum macrostachyum;* 40838. *Ophiuros exaltatus;* 40867. *Hackelochloa granularis;* 40885. *Isachne Myosotis;* 41090. *Sorghum laxiflorum;* 41172. *Pennisetum macrostachyum;* 41238. *Ichnanthus vicinus;* 41356a. *Sacciolepis indica* mixed with *S. myosuroides;* 41608. *Polytoca macrophylla;* 41714. *Isachne villosa;* 41715. *Microstegium spectabile;* 41808. *Ichnanthus vicinus;* —. *Isachne Brassii* (October 20, 1940); —. *Brachiaria coccosperma* (February 21, 1940).

DOCTERS VAN LEEUWEN, W. M. 9252. *Paspalum conjugatum;* 9709. *Echinochloa crusgalli;* 9727. *Pennisetum macrostachyum;* 10167. *Echinochloa crusgalli;* 10498. *Digitaria radicosa;* 10500. *Imperata exaltata;* 10787. *Isachne Myosotis;* 10804. *Coix Lacryma-Jobi;* 10809. *Sacciolepis indica;* 10814. *Setaria palmaefolia;* 11149. *Hymenachne amplexicaulis;* 11368. *Polytoca macrophylla.*

HARTMAN, E. 73. *Panicum sarmentosum.*

HERRE, A. W. 132. *Pennisetum macrostachyum;* 185. *Ischaemum muticum;* 198. *Polytoca macrophylla;* 231. *Imperata exaltata;* 284. *Saccharum spontaneum;* 313. *Setaria palmaefolia;* 319. *Echinochloa stagnina;* 322. *Coix Lacryma-Jobi;* 335. *Coix Lacryma-Jobi.*

HOMBRON, J. B. 1841. *Panicum ambiguum.*

JESWIET, J. —. *Saccharum spontaneum* (June, 1928); —. *Saccharum spontaneum* (July, 1928).

KAJEWSKI, S. F. 1779. *Setaria palmaefolia;* 1840. *Coix Lacryma-Jobi;* 1897. *Panicum cambogiense;* 1989. *Polytoca macrophylla;* 2139. *Cyrtococcum oxyphyllum;* 2245. *Pennisetum macrostachyum;* 2253. *Cyrtococcum patens.*

KANEHIRA, R., & S. HATUSIMA. 13093. *Panicum mindanaense* var. *villosa;* 13160. *Oplismenus hirtellus;* 13243. *Microstegium ciliatum* var. *laxum;* 13291. *Erianthus fastigiatus;* 13371. *Setaria pallide-fusca;* 13390. *Andropogon brevifolius* var. *cryptopodus;* 13588. *Isachne arfakensis;* 13826. *Sacciolepis indica;* 14019. *Isachne albens;* 14144. *Brachiaria subquadripara;* 14221. *Isachne Brassii.*

KING, REV. COPELAND. 1018. *Apluda mutica;* —. *Panicum cambogiense* (in 1912).

KLOSS, C. B.—. *Sacciolepis indica* (Jan. 1913).

LAUTERBACH, K. 24. *Pennisetum macrostachyum.*

LEDERMANN, C. 10444. *Isachne Brassii.*

MACFARLANE, S. 48. *Apluda mutica.*

MACGREGOR, Sir WILLIAM. 7. *Germainia capitata;* 8. *Eulalia irritans* var. *egregia;* 10. *Andropogon micranthus;* 11. *Setaria surgens;* 12. *Panicum sarmentosum;* 13. *Setaria surgens;* 14. *Echinochloa crusgalli;* 18. *Panicum macrocladum;* 19. *Rottboellia rottboellioides;* 20. *Andropogon micranthus;* 21. *Panicum viale;* 37. *Alloteropsis semialata;* 41. *Panicum sarmentosum;* 46. *Chrysopogon elongatus;* 50. *Isachne villosa;* 52. *Andropogon micranthus* var. *muticispiculus;* 53. *Eulalia irritans;* —. *Cenchrus Brownii* (in 1889).

NAUMANN, C. —. *Pennisetum macrostachyum* (Aug. 8, 1875).

PARKINSON, R. 45. *Sorghum nitidum;* 47. *Ischaemum muticum;* 64. *Themeda gigantea* var. *amboinensis;* 65. *Imperata exaltata;* 66. *Digitaria pruriens.*

PEEKEL, G. 301. *Digitaria longissima.*

PRATT, A. E. —. *Coix Lacryma-Jobi* (Dec. 1908).

REEDER, J. R. 799. *Paspalum conjugatum;* 801. *Andropogon micranthus* var. *muticispiculus;* 802. *Alloteropsis semialata;* 803. *Themeda triandra;* 804. *Setaria pallide-fusca;* 805. *Paspalum paniculatum;* 806. *Hackelochloa granularis;* 808. *Sorghum nitidum;* 809. *Rottboellia rottboellioides* [specimen at A]; 809. *Ophiuros exaltatus* [specimen at US]; 810. *Andropogon micranthus* var. *muticispiculus;* 811. *Digitaria longiflora;* 812. *Chrysopogon aciculatus;* 813. *Imperata exaltata;* 815. *Paspalum scrobiculatum* var. *bispicatum;* 817. *Digitaria radicosa;* 818. *Paspalum scrobiculatum;* 819. *Apluda mutica;* 820. *Cyrtococcum oxyphyllum;* 821. *Eulalia trispicata;* 822. *Sorghum laxiflorum;* 823. *Sacciolepis indica;* 824. *Cyrtococcum patens;* 825. *Sacciolepis indica;* 826. *Paspalum scrobiculatum;* 828. *Saccharum spontaneum;* 829. *Digitaria pruriens;* 833. *Digitaria violascens;* 841. *Brachiaria subquadripara;* 842. *Polytoca macrophylla;* 845. *Ischaemum digitatum* var. *polystachyum;* 847. *Sacciolepis indica;* 849. *Andropogon brevifolius* var. *paradoxus;* 855. *Setaria pallide-fusca;* 868. *Oplismenus hirtellus;* 885. *Setaria palmaefolia;* 886. *Pogonatherum paniceum;* 904. *Panicum cambogiense;* 905. *Panicum mindanaense.*

RODATZ & KLINK. 69. *Oplismenus compositus.*

ROGERS, H. J. 3001. *Imperata cylindrica* var. *major;* 3003. *Andropogon micranthus* var. *muticispiculus;* 3004. *Themeda triandra.*

RUSSELL, DEKALB, Jr. —. *Oplismenus compositus* (May 23, 1943).